

COMPUTER SOFTWARE ASSOCIATES

PRACTICALTM
II

by Sandy Ruby

**An Electronic Spreadsheet
for
Apple IIplus, Apple IIe
and
48K Compatible Computers**

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Manual by Kathleen F. Nolan

1/84CSA15M

Introduction

PractiCalc II — A Tool for You

PractiCalc II is a fast, extremely versatile, easy-to-learn multipurpose electronic worksheet for all Apple IIplus, Apple IIe and compatible computers (minimum 48K required). Its rows and columns provide an easy format for working with large amounts of information.

PractiCalc II is a number handler with 23 math functions that alone, or in combination, can figure a budget, a check book, a payroll or most any other math problem you might ask of it.

PractiCalc II is a sorter, alphabetically A to Z or Z to A, and numerically, highest to lowest or lowest to highest.

PractiCalc II also has the features that make it easy to write spreadsheets. You can insert, delete, move, replicate, search for entries and change the formats of numbers.

This manual has been designed to present PractiCalc II to users of all levels of experience. If you have never used a spreadsheet, we suggest you set aside time to start with Part One and read through the entire manual carefully. In Parts Two and Three, a continuing sample problem for you to do with PractiCalc II is set apart in shaded gray areas. Each exercise illustrates another of PractiCalc II's features. When you finish with all the exercises, you will have a spreadsheet suitable for use as your checkbook.

For those who are somewhat familiar with spreadsheets, you might want to skim through Part One and concentrate on Parts Two and Three. These sections will describe all features of PractiCalc II and contain the checkbook sample as well.

And for those who've seen most every spreadsheet on the market and are still searching for perfection, load PractiCalc II, glance at Parts One and Two, and jump right into Part Three. We think you'll be pleasantly surprised at just how much this spreadsheet can accomplish.

Finally, we urge each user, regardless of your spreadsheet knowledge, to make full use of the index and the Quick Reference Guide to PractiCalc II. These two parts of the manual are invaluable tools for quick access to any information about PractiCalc II.

PractiCalc II is adaptable, easy, yet powerful and should more than meet your spreadsheet needs. Best of luck with the program!

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Part One

What's a Spreadsheet?

Loading PractiCalc II

The Spreadsheet and Its Parts

Labels, Values and Formulas

Entering Information

Correcting Mistakes

^D: Delete

/B: Blank

/C: Clear

ESC: Escape

What's a Spreadsheet?

The term 'spreadsheet' originally described the large worksheets used by accountants. Now commonly used in many areas, a spreadsheet is a series of rows and columns that provides a convenient way of organizing information.

PractiCalc II is an **electronic spreadsheet**, which simply means it's a worksheet on a computer. Think of it as a sheet of 250 rows and 100 columns. 'Behind' the worksheet are 23 mathematical functions and more than 15 spreadsheet features. These allow PractiCalc II to add the columns, alphabetize the names, and perform for you a host of other practical functions.

PractiCalc II is a **program** or set of instructions which the Apple is equipped to understand. To use PractiCalc II, you must load the program from the enclosed disk. The information which you type, the names, numbers, sales figures, addresses, etc., is called **data**; a worksheet of data is called a **file**. Without the program, the Apple can't understand your files. Therefore, always be sure that you've loaded the PractiCalc II program into the Apple before loading a file.

Loading PractiCalc II

The process of loading PractiCalc II into your Apple is a simple one. The following steps outline the easiest way to prepare the PractiCalc II program for your use.

1. Make certain the Apple, disk drive and monitor are connected by the appropriate cables and that the Apple is securely plugged into an electrical outlet.
2. Insert the PractiCalc II disk into drive 1 and close the door gently.
3. Turn the Apple on. The switch is located on the back of the Apple at the left side. A small bracket () will appear in the lower left corner and the screen will read:

Illustration 1-A:



```
PRACTICALC II (C) CSA 1984 NOW LOADING . . .
```

All characters which are to be typed and keys which are to be pressed according to the instructions in the manual will be represented in **boldface** type. Punctuation of the step-by-step instructions may not follow correct grammatical practice and may appear inconsistent. The absence of punctuation in certain instances should eliminate confusion about exactly what is to be typed.

Apple IIe Users: Depress the CAPS LOCK key in the lower left corner of your keyboard to type in all upper case letters. The option to type in both upper and lower case letters on the Apple IIe is described in Part Four, under The Options Menu.

Before explaining the spreadsheet and its parts, take a look at the keyboard of your Apple II. If you own an Apple IIe, there will be notes such as the one above explaining slight differences in PractiCalc II. The features of the spreadsheet program, however, are identical.

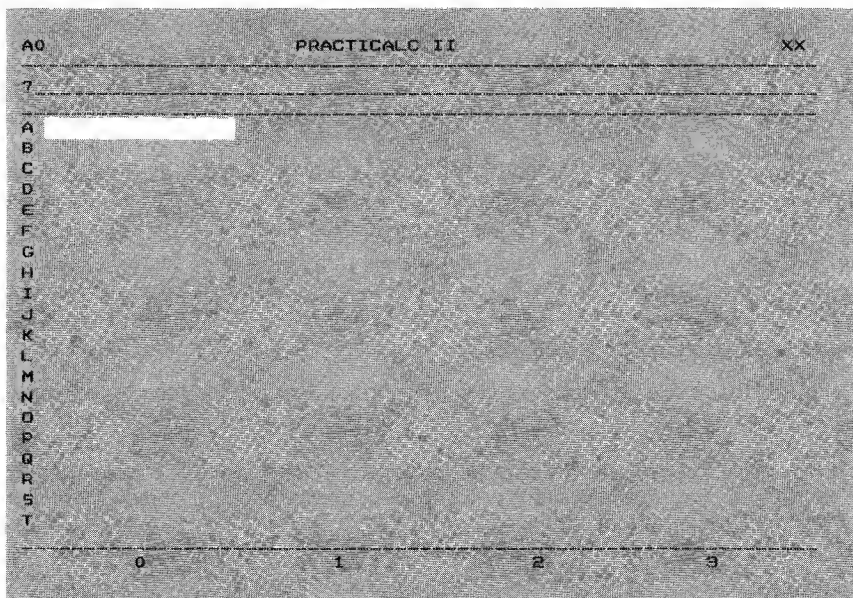
Notice the CONTROL key at the left side of the keyboard. Many of PractiCalc II's features are accessed through the use of the Apple's CONTROL key and the alphabetic characters of the keyboard. Symbolized by a small upwards caret (^), the CONTROL key must be depressed when you type the letter which follows the caret. Control characters (such as CONTROL and E) for editing will be shown as ^E and referred to as control E. Remember to hold down the CONTROL while striking the letter which follows the caret.

Note 1-A: PractiCalc II can be used with certain 80-column cards. The option for 40- or 80-column display is discussed in Part Four, The Options Menu.

The Spreadsheet and Its Parts

After successfully starting PractiCalc II, a complete spreadsheet will appear on your monitor screen as shown below:

Illustration 1-B:

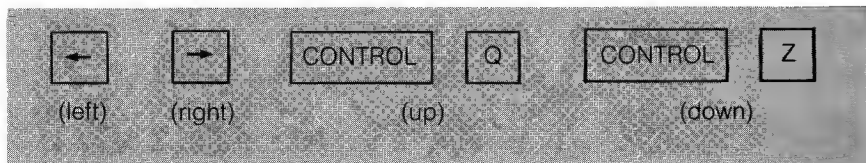


The spreadsheet, when loaded, is 250 rows down by 100 columns across. The screen, however, can only display a portion of the spreadsheet and in that way provides a partial view of the sheet; there are many more rows and columns than those that can be displayed at one time. Each column is nine characters wide. The rows are labelled alphabetically in the far left margin. The first 26 rows will be labelled A-Z. The next 26 rows will be the letters of the alphabet preceded by the letter A, the following 26 preceded by the letter B and so on. For example, the thirtieth row will be labelled AD. Thus, with 250 rows, the last row is IU.

The columns are labelled numerically across the bottom of your screen. Note that the first column is labelled '0', not '1'. This allows you to enter names, titles or labels in the first column, yet still have the '1' column available for first quarter's or first month's information. With 100 columns, PractiCalc II's last column is 99.

The **cursor** is the large rectangular shaded block which is located in cell A0 when PractiCalc II is first loaded. The cursor is moved by the two cursor arrow keys, control Q and control Z.

Illustration 1-C:



To move the cursor from left to right, press →.

To move the cursor from right to left, press ←.

To move the cursor down the screen, press CONTROL and Z .

To move the cursor up the screen, press CONTROL and Q .

Apple IIe Users: All four arrow cursor keys (up, down, left, right) can be used with PractiCalc II as well as control Z and control Q.

The intersection of one row and one column forms a cell. A cell's position is given by **cell coordinates** or the row and column where the cell is located. In Illustration 1-B, the cursor is in cell A0, the intersection of row A and column 0. This position is also known as the **home position**.

PractiCalc II has two additional keys to move the cursor around the spreadsheet. To reach any specific cell, type >. The top of the screen will read: RC>. Enter any set of cell coordinates, press RETURN and the cursor will move to that cell. Enter a row number, press RETURN and the cursor will move down the column that it's in to the specified row. Or, enter any column number and the cursor will move across the row to that column.

You can also reach the home position (cell A0) by pressing **control T** (^T) for top of screen.

Apple IIe Users: The TAB key acts the same as control T and will return the cursor to the home position. The only exception to this is mentioned in Part Two, Editing Formulas and Labels.

The top line of the spreadsheet is the **indicator line**. At the far left you will see the **cell indicator** which provides the coordinates of the cursor's position. The title space, which reads **PractiCalc II** when first loaded, will also indicate which file (if any) is currently loaded into the Apple and displayed on the screen.

To the right of the title PractiCalc II is the **memory/character indicator**. PractiCalc II can be used on Apple IIplus computers, with or without added memory, and on Apple IIe computers. When the program is loaded, it totals the memory available after the program is loaded, and displays the amount (in K) in the upper-right corner.

When you are *not* typing information, the indicator tells the current memory available. Later, if you're working on a very large spreadsheet, keep an eye on this figure. If you run out of memory, you run the risk of losing the data which you're working on. If the memory indicator reaches zero on a large spreadsheet, you have used virtually all available memory. Should the numeral zero be displayed within a reversed square, you have truly used **all** memory and must blank some cells before executing any commands or entering any data. It is strongly suggested that you not attempt to fill the memory to capacity. Always leave some extra memory as a margin of safety.

When you are typing information or executing a command, this number changes as you type and tells how many spaces you have typed thus far in that entry. So that the available memory will not be confused with the number of characters typed in an entry, a small plus (+) or minus (–) sign will follow the indicator when you are typing. If you are entering information for the first time, the plus sign will be displayed after the number, and if you are editing, a minus sign will follow the number. This character count feature is especially useful when trying to 'fit' data into cells of a certain width.

The second line of the spreadsheet is the **data line**. All information which you type will appear on this line as you are typing it. The **prompt** is the small block on the data line which moves across the data line as you write information. This small square never leaves the data line, but only marks your movement across the line. The prompt can move both left to right as you type, and right to left, as you *edit* or change formulas or labels. (Part Two explains how to edit entries.)

The third line from the top of the spreadsheet is the **formula line**. Once a formula is written in a cell and calculated, the answer (and not the formula) appears in the cell. The formula which gave that answer will appear on the formula line when the cursor is moved to that cell.

Labels, Values and Formulas

All information which you enter into the spreadsheet will fall into one of three categories:

Labels are pieces of information which are not representative of a numeric value. Labels, therefore, cannot be used in mathematical formulas. Labels are **left-justified** and are placed, when first entered, against the left side of the column they are in. In Illustration 1-D, the words 'name', 'cost', 'price' and 'profit' are all labels and are against the left-side of their respective columns.

Illustration 1-D:

A0	PRACTICAL II			24
7				
A	NAME			
B				
C	75.00	109.00	34.00	
D	COST	PRICE	PROFIT	
	0	1	2	3

Values are always numbers or cell locations which hold numbers. Values, when initially entered, are **right-justified**; they're against the right side of the column into which they are entered. The values 75.00, 109.00 and 34.00, shown above in Ill. 1-D, are values and are against the right side of the column.

When a cell contains a numeric value, the coordinates are equivalent to the value. Cell C1, in Ill. 1-D, holds the number 109.00. The formula "109.00*1.05" is the same as "C1*1.05", as long as cell C1 contains the number 109.00.

Formulas are mathematical sentences which execute operations on given values to provide a value. Values (numbers and cell coordinates), operators and functions can all be used in formulas. Examples of formulas would be:

$$100 - 23.89 \quad A3 + D4 - T5 \quad \text{SQR}(81) * 18$$

PractiCalc II interprets, as you type, whether an entry is a value, label or formula. The letter **L** will appear within the prompt, (which is also the **entry indicator**), on the data line if PractiCalc II considers the entry to be a label. If the entry is a value, the letter **V** will appear in the prompt. And if you designate the entry as a formula, (as explained in Part Two), the letter **F** will appear in the prompt.

Entering Information

To enter information in the PractiCalc II spreadsheet, type on the Apple keyboard as you would on a standard typewriter. PractiCalc II uses all capital letters (upper case) for commands, functions and features. Apple IIe users should refer to Part Four, The Options Menu, for an explanation of how to change to upper and lower case entries.

There are three steps to entering information in the PractiCalc II spreadsheet:

1. **Move** the cursor, with the cursor keys, to the cell where the information is to appear.
2. **Type** the information (label, value or formula) on the data line.
3. **Enter** the information in the selected cell by pressing **RETURN** or a **cursor key**.

If you press RETURN, the information will appear in the cell and the cursor will stay on that cell. If you press a cursor key to enter the information, it will be entered and the cursor will move one cell in the direction of the cursor key you struck.

Try entering data in the spreadsheet. The upper-left indicator will reflect the movement of the cursor. After you move the cursor to the correct cell and start typing, the upper-right indicator will tell the length of the entry you're typing.

Correcting Mistakes

After learning the three steps to entering information, you should next know that PractiCalc II provides six ways to correct an error:

1. The **DELETE** feature: If you recognize an error on the data line while you are writing the information, type **^D** (control D). Much like the backspace on a typewriter, control D moves back and erases one space with each touch of the key. Back up to your mistake, correct it and continue typing.

Apple IIe Users: The DELETE key, in the upper-right corner of the IIe keyboard, may be used in the same way to delete information.

2. The **BLANK** feature: If you have entered a piece of data in the wrong cell and need to **blank** the cell,

— Move the cursor to the cell.

— Type **/** and then type **B**.

The slash opens up the command menu which is explained in greater detail in Part Two.

3. The **CLEAR** feature: If you want to clear the entire spreadsheet and start with an empty sheet,

Type **/C**. The data line will read: CLEAR Y/E?

Type **Y** to clear the screen.

Type **N** to leave the screen as is.

Type **E** to exit the program.

IMPORTANT: The **CLEAR** option erases the entire spreadsheet. You will lose all data on the spreadsheet unless you saved it. (The process of saving files is described in Part Two.)

4. The **ESC** key: The **ESC** key can be thought of as an “all-purpose escape key” and will probably become one of your most valuable tools with PractiCalc II. **ESC** provides a convenient way to escape from most of PractiCalc II’s features. Pressing **ESC** escapes from any activity on the data line and restores an empty data line to the screen.

— **ESC** can be used when you want to stop and escape from an entry you are in the midst of typing.

— **ESC** escapes from any feature listed in the command menu as long as the command has not yet been fully executed.

If you reach the point in using a command of not understanding what you are doing, use **ESC** to escape. The key erases the information on the data line, but does not eliminate any data which is stored in the cells of the spreadsheet.

5. The **WRITE-OVER** feature: If you made an error and have entered the information in a cell, move the cursor back to the cell and type ‘over’ the information.

6. The **EDIT** feature: Labels and formulas can be edited without being rewritten or blanked. The edit feature is explained in depth in Part Two.

In what’s probably been less than a half hour, you’ve learned a great deal about PractiCalc II; how to enter data, correct mistakes and move easily around the spreadsheet. Part Two will explain how to write formulas and use PractiCalc II’s features. The checkbook example in the shaded boxes will also provide a good opportunity for you to practice each feature as you learn about it.

Part Two

The Formula Key

Order of Operations

Writing Formulas

Range Functions

Editing Formulas and Labels

The Commands

/I: Insert

/D: Delete

/M: Move

/J: Justify

/G: Global Format

/F: Cell Format

/H: Housekeeping (of Data Disks)

/S: Save a File

/L: Load a File

With PractiCalc II loaded and an understanding of how to use the spreadsheet, you're ready to start entering information.

Whenever you create a spreadsheet, it's best to take a few minutes and plan the arrangement of your data. PractiCalc II makes it easy to rearrange data, but the more planning you do at the start, the less work you'll do later.

A general explanation is given of each feature of PractiCalc II and *examples* are used where needed to further illustrate the functions. In addition, the shaded areas carry a continuing *exercise* based on a spreadsheet being used for a typical checkbook. Each part of the exercise shows a specific use of the previously-described feature. If you are a first-time user, you'll perhaps want to follow the exercises as you read the manual. The exercises build a checkbook file while making use of many of PractiCalc II's features. The checkbook file can also be adapted later for your personal use.

Exercise 1:

To set up a spreadsheet for use as a checkbook, clear the spreadsheet as mentioned in Part One. Type **/C** and then type **Y**. Label the columns, in Row A, as follows:

Column 0 = NUMBER	Column 3 = WITHDRAW
Column 1 = DATE	Column 4 = DEPOSIT
Column 2 = PAY TO:	Column 5 = BALANCE

With similar entries in your spreadsheet, the exercise will be easier to follow and to compare with the sample spreadsheet in the manual. Therefore, enter the necessary information so that your spreadsheet looks like the following. Check numbers are entered in column 0 and dates of the form mm/dd are entered in column 1. Since column 0 is right-justified and column 1 is left-justified, the two appear to run together. This will be corrected in a later example.

A	NUMBER	DATE	PAY TO:	WITHDRAW	DEPOSIT	BALANCE
B		12/31	BALANCE			4326.01
C	10101/02		MORTGAGE	900		
D	10201/03		ELECTRIC	124.94		
E	01/03		DEPOSIT		2000	
F	10301/06		E-Z PRINT	59.23		
G	10401/07		SMITH H20	198		
H	10501/09		M&M CLEAN	45		
	0	1	2	3	4	5

PractiCalc II has several features which will be introduced in the coming pages to make the checkbook easier to read and use. For now, unnecessary zeroes to the right of the decimal point will not be shown. A later section on formatting will explain just how to get the extra spaces displayed.

The Formula Key

A formula is simply a mathematical sentence consisting of values, mathematical operators and functions. It may contain up to 88 characters, including cell coordinates, numbers and parentheses.

All data entered in PractiCalc II falls into one of three categories: labels, values or formulas. PractiCalc II determines which category an entry falls into according to the first character of the entry. If the first character is a letter or non-numeric symbol, PractiCalc II treats the entry as a label. If the first character is a number, the entry is treated as a value and can be used in formulas.

But what about formulas? Some start with letters; **A3 + 102*1.2** is an acceptable formula. Others begin with numbers like **232.45 – 67.89**. Still others start with characters like parentheses.

To mark an entry as a formula, hold down the **CONTROL** key and type **F** (^F). This marks the entry as a formula which will produce a value when calculated.

Note 2-A: If you *start* a formula with a '+' or '-' followed immediately by a letter, the F will automatically appear in the entry indicator.

When control F is typed, the entry indicator within the prompt will change to the letter F. Control F can be pressed at *any time* while you are writing a formula across the data line. It will appear to the right of the characters on the data line.

When the formula is correctly written on the data line and you have typed control F, enter the formula by pressing RETURN or one of the cursor keys. Labels and values appear in the cells where they were entered. However, when a formula is entered, it will appear on the *formula line* (directly beneath the data line) when the cursor is moved over the cell. This leaves the actual cell free to display the answer to the formula when it is calculated.

If you forget to press control F and enter the information without designating it a formula, it will appear in the cell. It will also be treated as a value or label (depending on the first character of the entry). If this happens, enter the formula again and press control F or use the **edit feature** as outlined later in this part.

Order of Operations

To write formulas, you need the math operations and functions which can be combined with values.

Let's start writing formulas with four basic math operations: addition, subtraction, multiplication and division. PractiCalc II uses the following symbols to represent these operations: + for addition, – for subtraction, * for multiplication and / for division.

In formulas which contain more than one operator, the **order of operations** exists to ensure that the operators and functions of a formula are always performed in the same order with the same result. PractiCalc II follows this order.

Working from left to right through a formula, operations in parentheses are done first. Next, from left to right, multiplication and division are executed. These two operations are equal in importance. Therefore, PractiCalc II executes them in the order in which they appear.

Finally, addition and subtraction which are equal in importance (like multiplication and division), are performed, again from left to right.

If you wish to perform operations in a different order, use parentheses to isolate those operations which are to be done first. Always remember to close parentheses; otherwise error messages will result when the formula is calculated.

The following examples show just how the order of operations works and the difference parentheses can make.

Example 2-A:

$$\begin{array}{ccc} \text{2nd} & \text{1st} & \\ 5 + 5 / 5 = & 6 & \text{or} \\ & & \text{1st} \quad \text{2nd} \\ & & (5 + 5) / 5 = 2 \end{array}$$

Clearly, parentheses make a difference in the results of a formula. Use them carefully and always in pairs.

Writing Formulas

Remembering that formulas are combinations of values and operators, you're ready to start writing them. Formulas can be up to 88 characters in length.

The simplest way to see how formulas are written is to look at actual examples. Remember, use control F to designate the entry of a formula.

Note 2-B: Spaces are not necessary between values and operators but may be used. However, each space counts as one of the 88 characters allowed in a formula.

Example 2-B:

- a. If you wanted to add the numbers in cells A0, A1 and A2, divide the sum by three and then enter the answer in A4, you would move your cursor to A4, press ^F and write:
 $(A0 + A1 + A2) / 3$
- b. To divide the contents of cell B1 by 123.89 multiplied by 2.1 and enter the answer in B7, you would move the cursor to B7, press ^F, and write:
 $B1 / (123.89 * 2.1)$

Parentheses are necessary; otherwise the formula would divide B1 by 123.89 and then multiply the answer by 2.1.

PractiCalc II has two modes of calculation: manual and automatic. When the program is first loaded, the manual mode is in effect, which means the program will only calculate or solve formulas when told to do so. In the automatic mode, PractiCalc II acts on a formula and solves it as soon as the formula is entered. To learn how to change the mode of calculation, refer to Part Four.

To calculate in the manual mode, the data line must be empty with only the question mark showing in the entry indicator block. Then type an exclamation point (!) by holding the **SHIFT** key and typing **1**. All formulas will be calculated column by column, top to bottom, left to right. To change the direction of calculation, refer to Part Four.

As in BASIC, the operators < (less than), > (greater than) and = (equal to) may be used in true/false expressions. These expressions must be designated as formulas with control F. If the expression is true, a value of 1 will result upon calculation. If the expression is false, zero will result. For example, if cell A2 contains 15 and J10 contains 10, the formula $A2 < J10$ will result in zero since it is false.

Exercise 2:

To keep a running balance of the checking account, a series of formulas must be entered. The first formula, for example, takes the deposits (C4), subtracts any withdrawal (C3), and adds the results to the balance from the previous entry (B5). No one line should contain a withdrawal and a deposit; however, including both in the formula allows you to use one type of formula throughout the balance column.

Enter the following formulas in the corresponding cells. Remember to strike **^F** each time to designate the entries as formulas.

- In Cell C5, enter the formula $B5 + (C4 - C3)$
- In Cell D5, enter the formula $C5 + (D4 - D3)$
- In Cell E5, enter the formula $D5 + (E4 - E3)$
- In Cell F5, enter the formula $E5 + (F4 - F3)$
- In Cell G5, enter the formula $F5 + (G4 - G3)$
- In Cell H5, enter the formula $G5 + (H4 - H3)$

The order of operations in these formulas is: $B5 + (C4 - C3)$

Press **SHIFT** and **!** to calculate.

Range Functions

The four basic operators (+, -, *, /) act on one or two single values at one time. Thus, if you were to add a column of numbers, you would need to type each cell reference separated by a plus (+) sign. The term **range** refers to a row or column of *consecutive* cells. The range is noted by two sets of cell coordinates, separated by a comma and enclosed in parentheses. Full cell coordinates are needed to denote a range in a formula; the left or upper-most cell must be listed first. PractiCalc II's range functions let you work with many numbers at one time. The following table lists each function, describes what it does and provides an example.

Table 2-A:

Function	Definition of:	Used in a formula:
SUM [SUM]	Adds a range of numbers	SUM(A0,Z0) totals the numbers in Column 0 between Rows A and Z
COUNT [COU]	Counts the numeric entries in a range	COU(B2,B23) finds the number of numeric entries in Row B between Columns 2 and 23
MAXIMUM [MAX]	Finds the largest value in a range	MAX(D0,Q0) finds the largest value in Column 0 between Rows D and Q
MINIMUM [MIN]	Finds the smallest value in a range	MIN(Z0,Z37) finds the smallest value in Row Z between Columns 0 and 37
AVERAGE [AVG]	Yields the average of a range of numbers	AVG(A3,AF3) gives the average of all values in Column 3 between Rows A and AF

A few words on range functions: The range must be given as two cell coordinates separated by a comma and enclosed in parentheses. When range functions are calculated, *empty* cells which display no numbers and cells which contain labels are not included. However, cells which contain zeroes are included.

Editing Formulas and Labels

Once a formula or label has been entered in a cell, it can be changed without retyping the entire entry. This option, called the **edit feature**, lets you quickly change existing formulas and labels.

Note 2-C: Values cannot be changed with the edit feature.

Editing labels and formulas is a simple and time-saving process. There are three basic parts to editing:

1. To edit an entry, the cursor must be positioned over the cell. Press **CONTROL** and **E** (^E). The entry will be displayed on the *data line*. You are now in the edit mode. The entry indicator, which usually reads **F**, **L** or **V**, becomes the edit cursor and the character counter in the top right corner has a minus sign after it.
2. To move the edit cursor, use the left and right cursor keys as you would to move the cell cursor left or right. The up (^Q) and down (^Z) cursor keys, on the other hand, will enter the edited entry in the cell and move the cursor one cell in that direction.

3. To write over part of the entry, place the edit cursor over the character(s) to be changed and retype them.

To delete a character, move the edit cursor one character to the right of the character to be deleted. Press control D (**^D**) once for each character to be eliminated.

To insert a character, move the edit cursor to the place where the character is to be. Type control I (**^I**). Each touch of control I results in a blank space at the edit cursor location.

If you type a formula and forget to mark it as such with control F, it will most likely be entered as a label. To change it to a formula without retyping it,

- Place the cursor over the cell.
- Press **^E**.
- Press **^F** and **RETURN**. The entry will be changed to a formula.

Exercise 3:

The bottled water company to which check number 104 was paid should actually be LEE H2O instead of SMITH H2O. Therefore, using PractiCalc II's edit function, change the name without retyping the entire entry. This is a small example which you could very easily retype. However, the more quickly you become accustomed to the edit feature, the easier PractiCalc II will be to use. Therefore,

- Move the cursor to cell G2.
- Type **^E**. The name SMITH H2O will appear on the data line. Type LEE over the letters SMI. Then move the edit cursor (with the cursor keys) until it's in the space between the two words. Then type **^D** twice to erase the letters TH which were remaining.
- Press **RETURN**. Cell G2 will read LEE H2O. Since the column is of sufficient width, you can re-edit the entry if you would like so that it reads LEE WATER.

The Commands

In addition to its math functions, PractiCalc II has commands that make it fast and simple to handle information in the spreadsheet.

The majority of these commands are accessed by typing the slash (/). Type / and look at the data line. You will see a list of single letters as shown below:

Illustration 2-A:



The listing is called the **command menu**. It contains eighteen commands which will each be represented by a slash and the appropriate letter. Most of the commands can be divided into five categories:

Erasing Data:	B and C
Moving Data:	I , D , M and J
Formatting Data:	F and G
Storing Data:	H , S and L
Advanced Commands:	R , T , X , @ and -

To access the commands, the slash must be typed followed by the letter which represents the command. The instructions in the manual will combine the two steps. Thus, directions to blank a cell will be shown as **/B**, while justifying a label will be written as **/J**. Unlike the control key which must be held down while a letter is typed, the command menu requires that you type the slash, release the key and type the letter which follows.

The options for erasing data, **/B** and **/C**, were explained in Part One. **/B** blanks the cell where the cursor is located while **/C** clears the entire spreadsheet. The next three groups of commands will be explained here in Part Two while the advanced commands are discussed in Part Three of the PractiCalc II manual.

Two other commands, **/O** and **/P**, are discussed in Part Four. The **O** represents an options menu which allows you to select print specifications, upper and lower case (Apple IIe only), etc. The **P** command involves the actual printing of spreadsheets.

Moving Data

PractiCalc II has four commands which allow you to quickly move data in the spreadsheet without reentering information.

/I: Insert

The **I** command *inserts a blank row or column* wherever you indicate. When rows or columns are inserted, the cursor is placed where the blank row or column is to appear. All information, from the cursor position down the sheet or to the right, is moved down a row or over a column to the right. Formulas that mention cells moved by the insert process are automatically re-referenced to compensate for the movement of the data.

To insert a blank row,

- Move the cursor to any cell in the row where the blank row is to appear.
- Type **/I** and the data line will read: I "R/C"
- Type **R**. All rows from the cursor position down will be moved down one row and a blank row will appear in the cursor location.

To insert a blank column,

- Move the cursor to any cell in the column where the blank column is to appear.
- Type **/I** and the data line will read: I "R/C"
- Type **C**. All columns, from the cursor's position right, will be moved to the right. A blank column will appear in the cursor location.

PractiCalc II re-references automatically. When cells are moved because of an insertion, the formulas that reference those cells are updated according to the information's new locations. Re-referencing of a different type occurs, however, if you insert blank rows at the beginning or end of a range used in a formula. If the cell E0 contains the formula SUM(A0,D0), for example, and a blank row is inserted at row A, the formula will read: SUM(B0,E0). The original range is preserved. You cannot add extra rows or columns to the ends of a range used in a formula and expect them to be included in the range. You can, however, add rows and columns in the middle of the range and the range will be re-referenced (or expanded) to include them.

Exercise 4:

To keep track of money which you transfer to your savings account from the checking account (by check), you might want to create a specialized column of withdrawals. And, to see just how much of your salary you deposit in your checking account, an additional deposit column would also be helpful. To add two additional columns,

- Move the cursor to column 5.
- Type **/I**. The data line will read: | "R/C"
- Type **C**. A blank column will appear. Follow the procedure again for a second empty column, placing the cursor in column 6 and inserting a blank column.

When finished, columns 5 and 6 are empty and the BALANCE is located in column 7. Title column 5 SAVINGS and column 6 SALARY. Take the cursor over to the BALANCE column and note that the first coordinate in each formula has been rewritten to reflect the movement of the BALANCE column. (A later exercise will explain how to rewrite the formulas to include the two additional columns.)

A blank row between the titles (row A) and the first entries (row B) would make the spreadsheet easier to read. To insert a row,

- Place the cursor in row B.
- Type **/I**. The data line will read: | "R/C"
- Type **R** and a blank row will appear in row B.

Your checkbook format should now look like this:

A	NUMBER	DATE	PAY TO	WITHDRAW	DEPOSIT	SAVINGS	SALARY	BALANCE
B		12/31	BALANCE					4326.01
C	10101/02		MORTGAGE	900				3426.01
D	10201/03		ELECTRIC	124.94				3301.07
E	01/03		DEPOSIT		2000			5301.07
F	10301/04		E-Z PRINT	59.23				5241.84
G	10401/07		LEE WATER	178				5063.84
H	10501/09		M&M CLEAN	45				4998.84
	0	1	2	3	4	5	6	7

/D: Delete

Although it 'erases' information and could be grouped with the **/B** and **/C** commands, the **delete** command is most easily understood as the opposite of the insert command.

The **delete** command removes an entire row or column from the spreadsheet and moves the remaining data into the empty space. The delete command also changes formulas to compensate for the movement of cells used in the formulas. However, if a cell which is referenced in a formula is deleted, calculation of the formula will yield an error message. Move the cursor to the cell containing the formula; the deleted cell reference will have been replaced with **#** or **##**. Rewrite the formula with a valid cell reference and calculate again.

To delete a row,

- Move the cursor to any cell in the row to be deleted.
- Type **/D** and the data line will read: D "R/C"
- Type **R**. The row in which the cursor was located will be deleted. The rows beneath that point will each move up one row, closing in the space left by the deleted row.

To delete a column,

- Place the cursor at any point in the column to be deleted.
- Type **/D**. The Data Line will read: D "R/C"
- Type **C**. The cursor column will be erased and all columns to the right will move one position to the left to fill the space left.

If you had the formula $SUM(B1,K1)+B7$, and column 6 was deleted, the formula, after column 6 had been deleted, would read: $SUM(B1,K1)+B6$. If you had the formula $SUM(B1,K1)+B6$ and column 6 was deleted, the formula would read: $SUM(B1,K1)+B\#$ (since column 6 was deleted).

Exercise 5:

The entry listed as check #103 should actually be check #183. Since check #103 cannot be found at the moment and the information for check #183 will not be needed until much later, delete the row.

To delete row G,

- Place the cursor in row G.
- Type **/D** and the data line will read: D "R/C"
- Type **R** and check # 103 and its information will be erased.

The information beneath will each move up one row. Move the cursor to column 7 and check the formulas. The formula in cell G7 will read $\#7+(G4-G3)$ because you deleted row G, all rows information moved up one row, but the information you deleted from row G is still absent. Therefore, correct the formula to read $H7+(G4-G3)$.

/M: Move

PractiCalc II is also equipped with a command which will move an entire column, row or a single cell.

Moving a row or column is actually a combination of the insert and delete commands. The row or column is 'lifted' out of its original position. It is then *inserted* in the new position while the space it 'vacated' is *deleted*. Formulas are automatically re-referenced to reflect the changed positions of any cells which are moved. If you move any data and want the formulas to reference new locations relative to the new positions of the formulas, *you* must re-reference the formulas. Always check that formulas are re-referenced to reflect any changes you intended.

Moving a single cell is slightly different from moving rows and columns. When a single cell is moved, its original location is left blank. If you move a cell which contains a formula and there are cell references in the formula, the question FIX/REL will appear on the data line. You will then be asked if the cell references used in the formula should remain as they were in the original location (*fixed*) or if they should change and become relative to their new location. Refer to Part Three, The Replicate Command, where the concept of fixed and relative information is discussed in detail.

To move a row,

- Place the cursor in the row where you want the new row to appear (destination).
- Type **/M**. The data line will read: M FROM RC
- Type only **the letter of the row to be moved**.
- Press **RETURN**. The row, with formulas changed, will be inserted at the cursor location.

The following illustration takes the data originally in row F (i) and places it in row B (ii).

Illustration 2-B:

A	AMY	ANDREW	ANNE
B	BARBARA	BOB	BRETT
C	CAROL	CHRIS	CURT
D	DANIEL	DAVID	DIANA
E	EDWARD	ELAINE	ELLEN
F	FIONA	FRANK	FRED
	0	1	2

(i)

A	AMY	ANDREW	ANNE
B	FIONA	FRANK	FRED
C	BARBARA	BOB	BRETT
D	CAROL	CHRIS	CURT
E	DANIEL	DAVID	DIANA
F	EDWARD	ELAINE	ELLEN
	0	1	2

(ii)

To move a column,

- Place the cursor anywhere in the destination column where you want the row which you're moving to appear.
- Type **/M**. The data line will read: **M FROM RC**
- Type only **the number of the column to be moved**.
- Press **RETURN**. The column will appear under the cursor and all columns to the right will be moved over one position.

Illustration 2-C first shows column 1 in its original place (i) and then the result of moving that data to column 3 (ii).

Illustration 2-C:

A	100	200	300	400
B	105	205	305	405
C	110	210	310	410
D	115	215	315	415
E	120	220	320	420
F	125	225	325	425
	0	1	2	3

(i)

A	200	300	400	100
B	205	305	405	105
C	210	310	410	110
D	215	315	415	115
E	220	320	420	120
F	225	325	425	125
	0	1	2	3

(ii)

To move a cell,

- Place the cursor in the cell where the information is to go.
- Type **/M** and the data line will read: M FROM RC
- Type the **coordinates (row and column)** of the cell which is to be moved. The cell will appear in the new location and leave a blank cell in its former place.

Exercise 6:

The \$2000.00 deposit, dated 01/03, was actually entered in the wrong place. The money was not deposited until 01/08. Therefore, you need to move row F to row G's position.

- Place the cursor in any cell of row G.
- Type **/M**. The data line will read: M FROM RC
- Type **F** and press **RETURN**. Change the date of the deposit to 01/08. You will have to edit the formulas in the balance column since you now want the first coordinate in the formula to reference the cell above the formula and not the cell which it originally referenced. This re-referencing is *not* done automatically since the original cells are still in their original positions. Cell F7 should read $E7 + (F4 - F3)$, Cell G7 should read $F7 + (G4 - G3)$ and H7 should read $G7 + (H4 - H3)$. Calculate and the screen will look as follows:

A	NUMBER	DATE	PAY TO	WITHDRAW	DEPOSIT	SAVINGS	SALARY	BALANCE
B								
C		12/31	BALANCE					4326.01
D		10101/02	MORTGAGE	900				3426.01
E		10201/03	ELECTRIC	124.94				3301.07
F		10401/07	LLE WATER	198				3103.07
G		01/08	DEPOSIT		2000			5103.07
H		10501/09	M&M CLEAN	45				5058.07
	0	1	2	3	4	5	6	7

/J: Justify

When labels and values were defined in Part One, their justification was explained as well. Values appear against the right side of the column when entered, and labels are placed against the left side of PractiCalc II's columns.

One of PractiCalc II's commands changes the justification of labels from the left of the column to the right. This command is most often used to improve the appearance of the spreadsheet, especially when entries are long and may appear to run together.

To change the justification of a label,

- Place the cursor over the label which is to be moved.
- Type **/J** and the label will be right-justified.

To return a label to its original position against the left side of the column, execute the *same* steps again. The label will go back to the left of the column.

The justification of values, unlike that of labels, cannot be changed after the value has been entered. The **/J** command is used, however, to change values from a numeric representation to a bar graph. Graphing with PractiCalc II is thoroughly explained in Part Three of this manual.

To make a number which is a title into a label, press **^L** before entering the number. Pressing **^L** will make the indicator block change to **L**. The number which is then entered will be left-justified and will be a label. This feature can be used to change numerical headings, such as 1984, into labels.

Exercise 7:

A glance at the check register shows that the check numbers in column 0 are running into the dates in column 1 because the check numbers are treated as values and are therefore right-justified while the labels in column 1 are left-justified. Therefore, re-enter the existing check numbers, designating each number as a label. This will be one of the rare occasions when you'll have to re-enter information. From now on, remember to designate all check numbers as labels.

Re-type numbers 101 through 105, pressing **^L** before each number.

Formatting Data

The **format** of data is simply the way the data is presented. Formatting in PractiCalc II refers only to values. With PractiCalc II, there are four possible formats a value may take.

- **integer** format [I]: Numbers are displayed as whole numbers without decimal points.
- **dollar** format [\$]: Numbers are shown with two places to the right of the decimal point.
- **floating decimal** format [F]: Numbers are shown with a decimal point where needed to most accurately display value.
- **graphics** format: Numbers are quantitatively represented by bar graphs, also known as **histograms**.

One or all four formats may be used in the PractiCalc II spreadsheet at one time. The formats may be set individually by cell or for the entire spreadsheet. However, an individual cell can only contain, at one time, the graphics format and one of the other three numeric formats.

The format of the entire spreadsheet is known as the **global** format. When PractiCalc II is first loaded, the global format is the floating decimal format.

/G: Global Format

The **global** format is the common format given to all cells in the spreadsheet. When PractiCalc II is first loaded, the global format is the floating decimal format; therefore, numbers will appear exactly as entered. The **/F** command, explained in the next section, will show how to make individual cells' formats differ from the global format.

Since the **/G** command of the menu makes global changes, the global column width is also included in this command. All columns are nine characters wide when PractiCalc II is first loaded. You can change the global column width, (the width of all columns), to any number of characters between 3 and 38. You can also set an individual width for each column. (See Part Three, the **/T** Command.)

To set the global format,

- Type **/G**. The data line will read: I \$ F 3-38
- To make the global format the **integer** format, type **I**.
To make the global format the **dollar** format, type **\$**.
To make the global format the **floating decimal** format, type **F**.
To change the width of all columns, type **a number between 3 and 38**.
- Press **RETURN**.

Global formats can be changed as often as necessary, but only one change to the format can be made each time. For example, you can't type **/G** and then **5\$** in an attempt to make all columns five characters wide *and* in the dollar format. Simply run through the procedure twice, once to set the column width at five and again to set the dollar format.

Note 2-D: The integer format does not round the numbers to the nearest whole number but simply does not display the digits to the right of the decimal point. A number such as 78.9 would be displayed as 78. However, the actual value, not the displayed value, is used in calculation and the answer is placed in the integer format. If a number is represented in the integer format, you can easily see the full value by moving the cursor to the cell and pressing **SHIFT** and **#**.

Exercise 8:

Since most values in the checkbook will be in dollars and cents with two digits to the right of the decimal point, the **\$** (dollar format) would be the most appropriate global format. To set the global format to the dollar format,

— Type **/G**. The data line will read: **I \$ F 3 - 38**

— Type **\$** and press **RETURN**.

The values which you had tried to enter earlier with two zeroes to the right of the decimal place will now be represented as such.

/F: Cell Format

Just as the **/G** command set the format for all cells of a spreadsheet, the **/F** command exists to allow individual cells to differ from the global format. Each cell may have a format of its own, since there is no limit to the number of cells which may be individually formatted at any given time.

To format a cell,

— Place the cursor over the cell to be formatted.

— Type **/F**. The data line will read: **G I \$ F**

— To change the cell format to **integer** format, type **I**.

To change the cell format to **dollar** format, type **\$**.

To change the cell format to **floating decimal** format, type **F**.

To change the cell format to agree with the **global** format, type **G**.

If you change a cell's format so that it is different from the global format, the cell's format will be noted by a single letter or symbol (F,\$,I) in the left corner of the formula line whenever the cursor is on that cell.

Storage of Data

/H: Housekeeping (of Data Disks)

Spreadsheets which you write with PractiCalc II can be saved to disks for later recall. The disks on which the files are saved are called **data disks**. The house-keeping command is actually three separate commands used to manage data disks. The individual commands are *catalog*, *delete* and *initialize*.

Initialize is the first of the storage commands you'll need. When a disk is initialized, the Apple wipes the disk clean and prepares the disk for the recording of data. A new disk, fresh from the box, *must* be initialized before data may be saved to it. Or old disks, which contain data that's no longer needed, may also be initialized. If, however, you are recording data on a disk that already contains files which you want to keep, do *not* initialize the disk.

To initialize a disk,

- Type **/H**. The data line will read: CAT, DEL, INIT
- Place the blank data disk in the drive and close the door.
- Type **I** (initialize). The data line will read: INIT DISK Y?
- To initialize the disk, type **Y**. (If you mistakenly entered the initialize command, type **N**. The initialization process will not be started and the data line will clear.)

If you do choose to initialize the disk, the drive will whir and make a loud clacking sound. When the data line clears and the red drive light goes out, the initialization procedure will be finished.

The **catalogue** of a disk is much like the table of contents to the disk. The catalogue displays each file by name and at the conclusion, tells how many available sectors are left on the disk. (Sectors are a measure of disk storage space.)

To view the catalogue of a disk,

- Insert the disk in the drive.
- Type **/H**. The data line will read: CAT, DEL, INIT
- Type **C** (catalogue). The first file name will appear.
- Press **RETURN** or type **^Z** or **^Q** to see the next entry.

Each time you press any of these three keys, the next file name will be displayed. When the data line reads XXX SECTORS FREE #, you have reached the end of the catalogue. When saving large files to a disk which already contains several files, view the catalogue and check the remaining available space. If there is any doubt about your file fitting on the disk, save to another disk which has sufficient available space!!

Although you have not saved any data files yet, you can view the catalogue of the PractiCalc II program disk. Insert the disk, type **/H** and then type **C**. The title HELLO will be displayed. Press **RETURN** and the title PRACTICALC will be displayed. Press **RETURN** once again and the remaining space will appear.

The remaining feature in the housekeeping command is the **delete** (a file) feature. Delete will erase a file from a disk. Therefore, use with caution! Files are usually deleted when they will no longer (ever!) be needed and the space they use is needed for storage of other files.

To delete a file,

- Insert the data disk in the drive.
- Type **/H**.
- Type **D** (delete). The data line will read: `DELETE FILE`
- Type the name of the file to be deleted and press **RETURN**.

The file displayed on the screen cannot be deleted simply by pressing **RETURN** when the data line reads `DELETE FILE`. You must actually type the name of the file, thereby reducing the risk of accidentally deleting a file. The file will be erased and the space it occupied will be added to the remaining available sectors on that disk.

/S: Save a File

With PractiCalc II, it is easy to save your data to disks for permanent records. The spreadsheets or 'files' you create should only be saved to *initialized data disks*.

IMPORTANT: NEVER SAVE A SPREADSHEET TO THE PRACTICALC II PROGRAM DISK.

The **/S** command will allow you to view the catalogue of a disk as well as save the files you have written.

After having written a spreadsheet, you may want a permanent record of that file stored on disk. To save a spreadsheet for the first time,

- With the spreadsheet on the screen, insert the data disk.
- Type **/S**. The data line will read: `S FILE`
- Type the name of the file and press **RETURN**. When the drive light goes out and the data line clears, the file will have been saved. The file name will appear at the top of the screen.

As you continue to write spreadsheets and save them to your data disk, you may want to see the disk catalogue just before you save a spreadsheet. If the spreadsheet you're saving is an updated version of an old spreadsheet, you may actually want to write over and replace the old version with the new, in which case you would need the exact spelling of the original file name. Or if you don't want to write over any file but suspect that you've already used a particular file name, you can view the catalogue to see if the file name exists. Finally, you can also check to be sure that your disk has space enough to safely store your file.

To view a disk catalogue before saving a file,

- Insert your data disk in the drive.
- Type **/S** and the data line will read: `S FILE`
- Press **RETURN**. A file name will appear on the data line.
- To see the next file, press **^Q** or **^Z**.

- To write over a file, press **RETURN** when its title appears on the data line. The screen will read: FILE EXISTS WRITE OVER Y? If you type a name to save a file and a file of that name already exists, the same message will appear.
- Type **Y** to replace, **N** to escape the save command. If you replace a file, the name will appear at the top of the screen when the file has been saved. The red drive light will go out and the data line will clear when the save is complete.
- If you have not replaced a file, continue pressing either **^Q** or **^Z** until XXX SECTORS FREE # appears. The remaining available space marks the end of the directory. Press **RETURN** and the data line will clear.

Remember, when viewing the catalogue from the save command, use the cursor keys (**^Q** and **^Z**) to scan the catalogue. The **RETURN** key, in this command, is only to *open* the catalogue and to start the saving of a file.

When a spreadsheet is saved, all values, labels and formulas are saved. The **formats** of the spreadsheet are also saved: global formatting, cell formatting and graphic formatting.

If the saving procedure was unsuccessful, the red light on the disk drive will flicker on and off. Also, the file name will not appear on the indicator line at the top of the screen. If this happens, be sure that a formatted data disk is in the drive and that the drive door is closed securely; then save again.

When you are working with PractiCalc II (or any computer program) for a length of time, it is advisable to periodically save your data. Accidents, such as power surges and failures, do occur, and you could lose large amounts of data and several hours of work. You can always save a file and then continue working on it.

PractiCalc II is capable of saving selected portions of your spreadsheets. This feature is explained thoroughly in Part Three, Partial Spreadsheets.

Exercise 9:

You have made considerable progress with the checkbook file at this point and would perhaps like to save the file even though it is incomplete. A file can be saved, and then loaded and worked on at a later time. To save the file,

- Type **/S**. The data line will read: S FILE
- Remove the PractiCalc II program disk and insert your data disk.
If your disk has not been initialized, type **/H**. The data line will read: CAT, DEL, INIT. Type **I** to initialize the disk.
- The data line will read: INIT DISK Y? Type **Y** if there's no data on your disk to be saved.
- When the initializing is done, or if your disk was formatted, type **/S** and the data line will read S FILE.
- Type **CHECKBOOK** (the file name). Press **RETURN**.

When the saving procedure is finished, the name CHECKBOOK will replace the title PRACTICALC II at the top of the screen.

/L: Load a File

The *loading* process is used to retrieve saved files. Since a file is only a file of *data* and not instructions to the Apple, the PractiCalc II program must be loaded into the Apple II before a file can be loaded. The PractiCalc II program contains the instructions which enable the Apple II to interpret and act upon the data contained in the spreadsheets which you write. The PractiCalc II program is **not** saved with each file you write.

Much like the save command, the load command also offers access to the catalogue.

To load a file,

- Have PractiCalc II loaded.
- Insert the data disk and type **/L**. The data line will read: L FILE
- Press **RETURN**. A file name will appear. Press the **^Q** or **^Z** to see the next file on the disk. When the title of the file you wish to load appears, press **RETURN**. The file will be loaded and its title will appear at the top of the screen.

Use **RETURN** to start the catalogue and load the file whose title is displayed. Use **^Q** and **^Z** to look through the catalogue.

To load a file without entering the catalogue,

- Have PractiCalc II loaded.
- Type **/L**. The data line will read: L FILE
- Insert the data disk. Type the file name and press **RETURN**. The file will be loaded and its name will appear at the top of the screen.

Once a file is saved, you can also load portions of it back to the screen. Refer to Part Three, Partial Spreadsheets, for a further explanation.

Exercise 10:

If you saved the file CHECKBOOK to disk, clear the screen by typing **/C** and **Y**. To load the file again,

- Insert the data disk. Type **/L** and the data line will read: L FILE
- Press **RETURN**. Use **^Q** or **^Z** to find the title CHECKBOOK.
- When the name CHECKBOOK appears on the data line where the disk directory is displayed, press **RETURN**. After a slight pause, the file CHECKBOOK, as you saved it earlier, will appear on the screen.

With the conclusion of Part Two, you have seen many of PractiCalc II's basic spreadsheet commands. Part Three explains the 'extras'; those features and functions which make PractiCalc II more capable, convenient and a cut above the rest.

Part Three

/R: The Replicate Command

Advanced Commands

/T: The Title Command

/X: The Sort Command

/@: The Search Command

/—: The Drawing Command

Advanced Math Functions

The Direction Feature

Graphing With PractiCalc II

Consolidation of Spreadsheets

Partial Spreadsheets

Error Messages

/R: The Replicate Command

One of PractiCalc II's most useful features is the **replicate** command which copies data from one area of the spreadsheet into another. The replicate command is accessed by typing / and then **R**.

Four types of information can be replicated: labels, values, formats and formulas. Labels, values and formats never change when they are replicated; they are always copied 'as is'. Formulas which do *not* contain cell references are also copied as they originally appeared.

If a formula *does* contain cell references, however, the cell references may be copied **fixed**, which leaves them as they were in the original formula. Or, the cell references may be copied **relative**. A choice of relative will change the coordinates used in the new formula so that their relationship to the new formula will be the same as the original cell references' relationships to the original formula. Fixed and relative are actual opposites in the replication process. When you replicate a formula, you will be asked the question of fixed or relative for each cell reference in the formula.

Example 3-A:

Let's say that cell A0 contained the formula $(A1 + A2) - A3$. The formula, from A0, is replicated in each cell down column 0 to row D, i.e. into cells B0, C0 and D0. If all cell coordinates used in the original formula are to be relative to their new positions in the replicated formulas, the following formulas would appear. In cell B0, the formula would be $(B1 + B2) - B3$. In cell C0, the formula would read $(C1 + C2) - C3$. And in cell D0, the formula $(D1 + D2) - D3$ would appear. The coordinates used in the new formulas have the same relationship to *their* formulas as the original cell coordinates shared with *their* formulas. Thus, the coordinates are considered *relative*.

When replicating formulas, the coordinates need not all be relative or fixed. The replication process allows you to decide fixed or relative for *each* cell reference used in the formula.

You may also replicate a formula exactly as it appears by answering *fixed* (to the question FIX/REL) each time. The formula will be copied as a fixed piece of data.

With PractiCalc II, you can replicate information from a single cell or from a group of adjacent cells. These cell(s) are called the **source** cell(s). The cell(s) into which you replicate, whether one or a group, will be called the destination or **target** cell(s). Source and target cells or ranges may be a single cell or a group of cells within a column, row or rectangular area made up of more than one row and column.

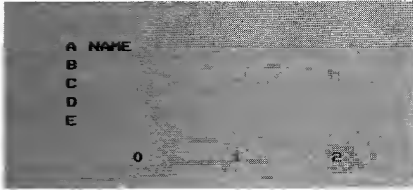
In the replication process, you must supply the beginning and ending coordinates of the source and target ranges. If you don't enter the coordinates when prompted to do so, the program uses the coordinates of the cursor position as the default coordinates. Thus, a major rule of replicating with PractiCalc II is this : **The cursor position counts**.

The flexibility of this command provides a variety of ways to replicate information. The possible ways are grouped in three categories, each of which is discussed and illustrated in the following pages. Follow the instructions carefully. Once you grasp just what the replicate command is doing, it will become a valuable tool for building spreadsheets.

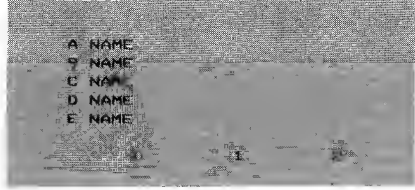
Replicating from a Single Cell into a Range

When replicating from a single cell into a range, the target range may be adjacent or non-adjacent to the source cell. The target range may also be a cell, a column, a row or a rectangular area. Illustration 3-A (i) shows a label which is then replicated down a column (ii).

Illustration 3-A:



(i)



(ii)

To replicate from a single cell,

— Enter the information to be copied in the correct cell and press **RETURN**. Leave the cursor on that cell, which is your source cell.

— Type **/R**. The data line will read: **REP FROM R/C**

The program needs the start and finish of the source range. Since the cursor is on the source cell, its position marks the beginning *and* end of the source range. Therefore, press **RETURN**. You will have actually entered the coordinates of the cursor's position twice as the start and finish of the source range, i.e. **A0,A0**.

— The screen will read: **REP TO \$#R/C**

If you are duplicating only the format of the source, type **\$**. This signals the program to copy the format of the source cell into the target range and leave the actual contents otherwise unchanged. (The **#** sign is explained under Partial Spreadsheets later in this part.)

You must now enter the two sets of coordinates of the target range. If the target range is *adjacent* to the source cell, the source cell, marked by the cursor, is also the start of the target range. Therefore, enter only the end of the range and press **RETURN**.

Note 3-A: If the end of the range is in the same row as the beginning (which is marked by the cursor), enter only the column number which marks the end of the target range. If the end of the range is in the same column as the start (which is the cursor location), type only the row number which marks the end of the target range.

If the target is *not* adjacent to the source cell, enter the beginning and ending coordinates of the target, separated by a comma, e.g. **B1,F2**. Press **RETURN**.

— If replicating a label, value, format or formula without cell references, the information will be copied at this point into each cell.

— If copying a formula with cell references, the question **FIX/REL** will appear on the data line and a shaded box will appear over the first cell reference in the formula on the formula line.

Type **F** (fixed) or **R** (relative). (Do NOT press **RETURN**.) The shaded cursor will move to the next cell coordinate in the formula. Answer **F** or **R** again. When the FIX/REL question has been answered for each cell reference in the formula, the formula will be entered in each cell of the target range. (Press **!** to calculate.)

Single Replication of a Range

With PractiCalc II, you can also copy a range exactly (information and arrangement of cells) from one point to another. To best understand this, look at the following illustrations closely. The range in row B (i) is completely copied in row E (ii).

Illustration 3-B:

A			
B	COST	PRICE	PROFIT
C			
D			
E			
F			
G			

(i)

A			
B	COST	PRICE	PROFIT
C			
D			
E	COST	PRICE	PROFIT
F			
G			

(ii)

To replicate a range,

- Enter the information in the source range.
- Move the cursor to the top left cell of the target range.
- Type **/R**. The screen will read: REP FROM R/C
- Type the coordinates of the source range, separated by a comma. If the source range is a single cell, type its coordinates twice, separated by a comma. Press **RETURN**.
- The screen will read: REP TO \$#R/C.

If duplicating only the formats of the range, type **\$**. If the target range is to be the same shape (i.e. cell, column, row or rectangle) as the source, press **RETURN**. The program will copy the source range, starting at the cursor location.

Note 3-B: Usually, if the coordinates of a range aren't supplied, the coordinates of the cursor position, by default, are the beginning and end of the range. Here, however, an entire range cannot be duplicated in one cell. Thus, PractiCalc II uses the cursor as the start of the target range and copies the other cells after it as they appeared in the source range.

- If copying labels, values or formats, the information will appear in the cells.

If copying a formula which contains cell references, the question of FIX/REL must be answered for each reference. Only then will the formula be entered in each cell.

Multiple Replications of a Range

This is perhaps the most complex form of replication and requires that you specify (by typing) the starting and ending coordinates of the source and target ranges. Thus, in this instance, the cursor position does *not* influence the replication process.

The range into which you're replicating is an extended range; it's actually several copies of a range over a range. Here the range in column 0 (i) is copied in columns 1, 2 and 3 (ii).

Illustration 3-C:

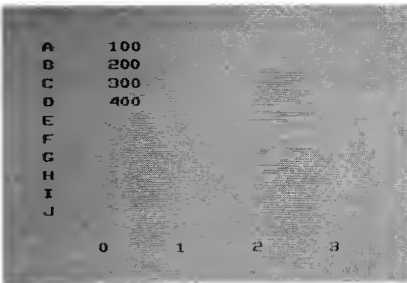


Table (i) shows a spreadsheet with data in column 0. The rows are labeled A through J, and the columns are labeled 0 through 3. The data in column 0 is:

Row	Column 0
A	100
B	200
C	300
D	400
E	
F	
G	
H	
I	
J	

(i)

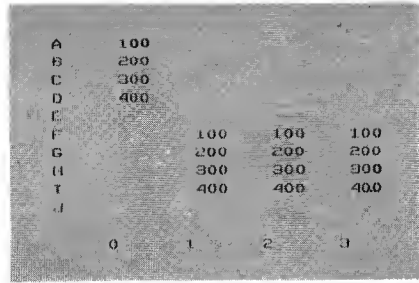


Table (ii) shows the data from column 0 replicated into columns 1, 2, and 3. The data is:

Row	Column 0	Column 1	Column 2	Column 3
A	100			
B	200			
C	300			
D	400			
E				
F	100	100	100	
G	200	200	200	
H	300	300	300	
I	400	400	400	
J				

(ii)

To replicate a range several times,

- Enter the source range of information.
- Type **/R**. The data line will read: REP FROM R/C
- Type the starting and ending coordinates of the source range, separated by a comma. Press **RETURN**.
- The screen will read: REP TO \$#R/C. If replicating just the formats of the cells within the range, type **\$**.
- Type the starting and ending coordinates of the target range, separated by a comma. Press **RETURN**.
- If replicating a formula, answer the FIX/REL question with **F** or **R** as many times as is needed. When finished, the formulas will be entered throughout the range. (Type **!** to calculate.)

Since replicating formulas is more difficult, a few examples may best show just how to use the procedure.

Example 3-B:

Start with the formula SUM (A0,A3) in Cell A4. Replicate it with both cell references relative to each cell through Row D. Place the cursor on cell A4. Press **/R** and **RETURN**. Type **D** and press **RETURN**. Type **R** and then **R** again. If you moved down column 4, the following formulas would appear on the formula line as you passed over the first four cells:

A				SUM(A0,A3)	
B				SUM(B0,B3)	
C				SUM(C0,C3)	
D				SUM(D0,D3)	
	0	1	2	3	4

Example 3-C:

Start with a range of formulas in row B as shown. Replicate the range across row D with the first two cell references relative and the last one fixed. To do so, place the cursor in D0. Type **/R** and then **B0,B3**. Press **RETURN**, then press **RETURN** again. Type **R**, **R** and then **F**. The resulting formulas will read:

A				
B	(A0+J0)*Z99	(A1+J1)*Z99	(A2+J2)*Z99	(A3+J3)*Z99
C				
D	(B0+K0)*Z99	(B1+K1)*Z99	(B2+K2)*Z99	(B3+K3)*Z99
	0	1	2	3

Example 3-D:

Start with a range of formulas in cells B0 to D0. Replicate the range from B1 to D3 with the cell reference relative. Type **/R** and then **B0,D0**. Press **RETURN** and type **B1,D3**. Press **RETURN** and then **R**. The following formulas would result:

A				
B	A0 + 100	A1 + 100	A2 + 100	A3 + 100
C	B0 + 100	B1 + 100	B2 + 100	B3 + 100
D	C0 + 100	C1 + 100	B3 + 100	C3 + 100
	0	1	2	3

Exercise 11:

When last worked on in Part Two, the checkbook file looked as follows:

A NUMBER	DATE	PAY TO	WITHDRAW	DEPOSIT	SAVINGS	SALARY	BALANCE
B							
C	12/31	BALANCE					4326.01
D 101	01/02	MORTGAGE	900.00				3426.01
E 102	01/03	ELECTRIC	124.94				3301.07
F 104	01/07	LEE WATER	198.00				3103.07
G	01/08	DEPOSIT		2000.00			5103.07
H 105	01/09	M&M CLEAN	45.00				5058.07
0	1	2	3	4	5	6	7

Much of the work in the checkbook spreadsheet file could be simplified with the replicate function. To start, the formulas in the BALANCE column are incorrect since the addition of the SAVINGS and SALARY columns. To update the formulas,

- Move the cursor to D7 and type **^E**.
- The formula $C7 + (D4 - D3)$ will appear on the data line in the edit mode. Edit the formula to include the two additional columns. It should then read: $C7 + (D4 - D3 + D6 - D5)$
- Press **RETURN**.
- Type **/R**. The data line will read: REP FROM R/C
- Press **RETURN**. The data line will read: REP TO \$#R/C
- Type **H** and press **RETURN**. The data line will read FIX/REL and there will be a shaded cursor over the coordinate C7 on the formula line.
- Type **R** for the first coordinate and the four succeeding ones; therefore type **R** a total of five times.
- The data line will clear and a formula, relative to each row, will be entered in cells D through H of column 7.
- Type **!** to calculate.

You could replicate the formula further down column 7. However, until values are entered, all cells in column 7 below row H would carry the last balance from cell H7.

Advanced Commands

In Part Two, the command menu and most of its listings were introduced. Four more commands remain to be discussed and have been included in this section since they are really enhanced features of PractiCalc II.

/T: The Title Command

The **/T** command combines two important features: titling and setting individual column widths.

Titling Rows and Columns

When using a spreadsheet, it is often helpful to 'freeze' the titles of the rows and columns in which you are entering information. Then, regardless of how far down or across the spreadsheet the cursor goes, the headings to those particular columns or rows remain on the spreadsheet to clearly identify the rows or columns.

PractiCalc II allows you to freeze columns, rows or both simultaneously. Since a heading may be several rows or columns deep, PractiCalc II can freeze several rows or columns on the screen.

IMPORTANT: PRACTICALC II FREEZES THE ROWS AND/OR COLUMNS FROM THE CURSOR POSITION TO THE EDGE OF THE SCREEN.

To freeze a title,

- Move the cursor so that the edge of the screen and the cursor mark the opposite boundaries of the area to be frozen.
- Type **/T**. The data line will read: R C B N G 1-38
- To freeze the row(s) between the cursor and the upper screen edge as titles, type **R** and press **RETURN**.

To freeze the columns between the cursor and the left screen edge as titles, type **C** and press **RETURN**.

To freeze both the rows and columns from the cursor to the upper and left edges of the screen, type **B** and press **RETURN**.

To undo a title,

- Type **/T**.
- Type **N** and press **RETURN**. The data line will clear and the titles will be unfrozen.

Example 3-E:

If you wanted to freeze rows A, B and C as titles, have row A against the top of the screen and place the cursor on row C. Type **/T**, type **R** and press **RETURN**. Rows A, B and C will be fixed as titles.

Example 3-F:

To fix rows C and D and column 1 as titles, move the cursor down and across the screen so that row C is against the top of the screen and column 1 is at the far left of the screen. Move the cursor into D1, type **/T**, type **B** and press **RETURN**. Rows C, D and column 1 will remain on the screen fixed as titles.

To change information in titled columns or rows without erasing the titles, use the **>** key (GO TO RC) and specify a coordinate within the titled space. However, if you use the **>** key to return to a row or column which is frozen **off** the screen, (such as Row A in Example 3-F above), the titling will be dissolved when you pass over and beyond the titled rows or columns.

Exercise 12:

To freeze the column headings of the checkbook file,

- With row A at the top of the screen, place the cursor in row B.
- Type **/T**. The data line will read: R C B N G 1-38
- Type **R** for title rows and press **RETURN**.

Rows A & B will remain on the screen regardless of where the cursor moves until the titles are dissolved.

Setting Individual Column Widths

The global format command (**/G**), discussed in Part Two, explained how to set one width for all columns of the spreadsheet. PractiCalc II also allows you to set a different width for each column of the spreadsheet.

When PractiCalc II is first loaded, the global column width is nine characters and can be changed to any number from 3 to 38. Individual columns can be set to any width between 1 and 38 characters.

To make a column a different width than the global column width,

- Move the cursor anywhere in the column which is to be changed.
- Type **/T** and the data line will read: R C B N G 1-38
- Type **any number between 1 and 38**.
- Press **RETURN**.

The width of the cursor column will change to the selected number of characters. There is no limit to the number of columns which may be of varying widths at any one time in the PractiCalc II spreadsheet.

To restore a column to the global column width,

- Move the cursor into the column which is to be changed.
- Type **/T** and the data line will read: R C B N G 1-38
- Type **G**, press **RETURN** and the cursor column will be restored to the global width.

When a column width is reduced below 3 characters, PractiCalc II does not display the numeric contents of the cell. Therefore, if the width of a column containing numbers is reduced to one or two characters in width, the contents are 'hidden'. This feature is often used for two reasons:

1. By shrinking several columns to one character in width, two non-consecutive columns can be displayed on the screen at the same time without moving the entire columns.
2. By shrinking a column to a width of one, its numeric contents will not be printed. Thus, if you wished to eliminate a column of confidential information from a spreadsheet which you were about to print, you could do so by merely changing that column's width to one character and essentially "hiding" the contents of the column without removing the data from the spreadsheet.

To 'hide' a column of numbers, change its column width to one or two characters according to the above steps.

Note 3-C: To see the contents of a cell whose column width is too small to display the contents, place the cursor over the cell and type **#**. The full contents of the cell will be displayed on the data line.

Exercise 13:

Various individual column widths would make the checkbook file easier to read. Column 0 could be made 4 characters wide, column 1 could be 6 characters wide and column 2 could be about 12 characters to allow for more complete entries. To change the column widths,

- Place the cursor in column 0 and type **/T**.
- Type **4**, press **RETURN** and the column will be reduced. Change the title from NUMBER to **#** and press **RETURN**. (To use **#** as a label, type any letter, delete it, and then type **#**. Otherwise, the **#** symbol will be interpreted as the command to display the full contents of the cell.)
- Place the cursor in column 1 and type **/T**.
- Type **6**, press **RETURN** and the column will be reduced.
- Place the cursor in column 2 and type **/T**.
- Type **12**, press **RETURN** and the column will expand.

/X: The Sort Command

One feature which makes PractiCalc II unique among spreadsheets is its ability to sort alphabetically and numerically. The **sort** command is symbolized by the **X** of the command menu.

PractiCalc II will sort alphabetically, from A to Z or Z to A, or numerically, from lowest to highest or highest to lowest. A few basic rules will best explain the sorting command:

- Sorting is always done within a section of a *column*.
- The start and end of the section to be sorted are marked by the cursor and a row coordinate which you enter.
- The cursor must be placed where the *highest* number or letter is to appear.
- A numeric or alphabetic sort is decided by the contents of the cursor cell. If the cursor is on a value, the column will be sorted numerically. If the cursor is on a label, the column will be sorted alphabetically. If the cursor is over a blank cell, no sort will be performed.
- All entries in the column not involved in the sorting process retain their original positions after the sort. Thus, values do not move during an alphabetic sort and labels do not move during a numeric sort. This is also true of blank spaces used for spacing within a column. By preserving the appearance of the spreadsheet during a sort routine, it is not necessary to respace the data after the sorting is finished.

To sort a column or section of a column,

- Move the cursor to the cell where the largest number or letter is to be at the end of the sorting process.
- Type **/X** and the data line will read: SORT FROM R
- Type the **row letter(s)** which mark the other end of the range to be sorted. Give only the row coordinate, not the full cell coordinates.
- Press **RETURN**. The column, from cursor position to specified row, will be sorted.

When a column is sorted, the corresponding data in other columns is also moved. For example, if column 2 is sorted and the data which was in cell B2 is moved to cell K2, all of row B is moved to row K along with the cell of the sorted column.

Sorting of extremely large files may take a few minutes. Wait for the reappearance of the cursor on the data line and the accompanying tone to signal the completion of the sorting process.

Note 3-D: Sorting re-references formulas with the entries, but range functions like SUM may not have the correct parameters (range limits) maintained. In this case, further calculation may yield undesired results. You may want to verify range formulas after sorting a column.

Exercise 14:

With the exception of the balance marked 12/31, you could always sort your checks and deposits according to the date column to be certain they were in the correct order. Although the dates are treated as labels because they each contain a non-numeric character (/), they will still be sorted in what appears to be numeric order. To do so,

- Place the cursor in column 1 on the last entry.
- Type **/X** and the data line will read: SORT FROM R
- Type **D** and press **RETURN**. In this instance the entries are arranged in the correct order, but if they were not, they would be arranged by date, provided all dates were entered in the same format (nn/nn) and were all entered as labels.

/@: The Search Command

As your spreadsheets increase in size, it becomes more challenging to remember where you entered certain information. To save you time scrolling through countless rows and columns, PractiCalc II has a search command which will bring you quickly to a desired piece of information.

The search feature can look for known or unknown entries where a wild card symbolizes a variable in the entry. Once the search has been started, you can look in six directions as activated by different keys:

- To search from the cursor position down the column, type **^Z**.
- To search from the cursor position up the column, type **^Q**.
- To search from the cursor position across a row from left to right, press **→**.
- To search from the cursor position across a row from right to left, press **←**.
- To search from the cursor position forward through the spreadsheet, press **RETURN**.
- To search from the cursor position backwards through the spreadsheet, press **^T**.

When looking for **exact entries**, the search command can find values, labels or formulas, provided they are *exact*. The cursor will only stop at the entry for which you are searching *if*:

- The entry, numerically, is an entry in its own right, or
- The entry, alphabetically, starts with the letters you are searching for, or
- The entry, a formula, is a valid formula.

To search for an exact entry,

- Place the cursor at the starting point of the search, which can be anywhere in the spreadsheet.
- Type **/@** and the data line will read: **SEEK**
- Type *exactly* what you are looking for. If searching for a formula, mark it as such with control F. The indicator on the data line, V, L or F, should accurately reflect what you are looking for.
- Press any of the cursor keys as listed above to *start* the search procedure. The spreadsheet will move so that the entry will always appear in the same place on the screen.

Once the cursor stops at the first entry which matches, you can start the cursor looking again in any direction by pressing any of the six keys. When there are no more entries which match in that direction, the cursor will remain over the last matching entry.

If the word **SEEK** remains on the data line, you can continue to search for the same item in *another* direction. Although the object of your search is not displayed, it is remembered. Or, you can type another item and start PractiCalc II looking for something else.

PractiCalc II will remain in the search mode with the prompt of **SEEK** on the data line. To exit the search feature, type **ESC**.

When you can't be precise about what you're searching for, the search command has two methods of looking for **variable entries**. However, formulas cannot be searched for using any variable methods. If you do not have the exact formula, the search feature will be of no use.

Symbolized by **@**, PractiCalc II's wild card can *only* be used when searching for alphabetic entries. The wild card symbol is used as a placeholder for letters in the entry for which you're searching.

When used at the start or end of an entry, the **@** can stand for any number of letters. When used between two letters, the **@** can only represent a single letter.

Example 3-G:

If searching for all entries that start with S,

- Type **/@**.
- Type **S@** and press one of the six keys which starts the searching process.

If searching for entries that end in INC,

- Type **/@**
- Type **@INC** and press one of the six keys to start the search.

If searching for all items whose three-letter codes start with T and end with X,

- Type **/@**
- Type **T@X**. Press one of the six cursor keys to start the search process.

PractiCalc II also helps you search for values in an approximate range. If you know that a value is greater than or less than a certain number, then you can search for it using those criteria.

Example 3-H:

To search for entries greater than \$1000.00,

- Type **/@**
- Type **1000<**. Then press one of the six cursor keys which start the search process.

To search for entries less than \$250.00,

- Type **/@**
- Type **250>**. Press one of the cursor keys to start the search.

When using **>** and **<** to search for an entry, the entry must end with the inequality sign. Write the entry carefully so that if you're looking for all numbers greater than X, you write **X<**, which means "X is less than the unknowns".

Since the search feature offers easy access to the contents of lengthy lists, PractiCalc II is able to be used as a data filer for addresses, inventory and other large files. The search command could be used as a look-up system if PractiCalc II were used as an inventory control program.

Exercise 15:

Imagine that the checkbook spreadsheet is large and you're looking for a \$2000.00 deposit.

- Move the cursor to cell A0.
- Type **/@** and the data line will read: **SEEK**
- Type **2000.00** and press **RETURN**. Cell G4 will be moved into the upper left corner of the spreadsheet, (the original cursor position on the screen).
- Press **ESC** to exit the search command.

/— : The Drawing Command

The last item of the PractiCalc II options menu is a drawing feature represented by a hyphen (—). The feature will take a character and fill each cell of a range with a series of that character. The drawing option will also, for display purposes, box a cell or group of cells with a series of characters to set it apart from the rest of the spreadsheet.

Actually a 'fun' option, the drawing feature is perhaps best understood if explained first through examples. Therefore, clear the screen and try the following steps:

Example 3-1:

- Move the cursor to A0.
- Type /—. The data line will read: LINE TO *R/C
- Type **6** and press **RETURN**. A broken line will be drawn across Row A to Column 6.
- Now move the cursor to B0. Type /—.
- Then type ***6** and press **RETURN**. A line of asterisks will be drawn across Row B to Column 6.
- Next move the cursor to Cell D0. Type /—.
- Type **G2** and press **RETURN**. A box made up of dotted lines will be drawn from D0 to G2 and will act as a frame for the cells in the center.
- Move the cursor to cell J0. Type /—.
- Type **<P5** and press **RETURN**. A box of "less-than" symbols (<) will be drawn from J0 to P5 and will frame the center cells of the area.
- Move the cursor to A7 and type /—.
- Type **&P**. Column 7 will fill with ampersands (&).

After having seen just how the option works, the rules will be easier to understand.

- The starting point of the drawing is the cursor position.
- The drawing option requires a **character** and a **target**.
- If a drawing character is not specified, the hyphen (—) is used by default.
- If the target given is **only** a column number, then a straight line of hyphens or any other specified character will be printed from the cursor cell to the specified column of that row.
- If the target given is only a row letter, then the cells of the column from the cursor position to the specified row will be filled with hyphens or any other specified character.
- If the target given is a cell coordinate (row *and* column), then a 'box' of either hyphens or a specified character will be formed with the center available to 'frame' information.
- When the drawing option is used, the data line reads: LINE TO *R/C. The asterisk (*) is not to suggest that asterisks are the only alternative character to hyphens, but simply to remind you that you do have a choice regarding which character is used.

Exercise 16:

A line in row B would separate the titles from the entries in the checkbook. To draw a double line,

- Move the cursor to cell B0. (If rows A and B are still titled, press **^T** to undo the titles and then move to cell B0.)
- Type **—** and then **=7**. A double line will be drawn in row B out to column 7.

The spreadsheet now looks like this:

A	B	DATE	PAY TO	WITHDRAW	DEPOSIT	SAVINGS	SALARY	BALANCE
C		12/31	BALANCE					4324.01
D	101	01/02	MORTGAGE	900.00				3424.01
E	102	01/03	ELECTRIC	124.94				3299.07
F	104	01/07	LEE WATER	198.00				3101.07
G		01/08	DEPOSIT		1112.00			4213.07
H	105	01/09	ASH CLEAN	45.00				4168.07
	0	1	2	3	4	5	6	7

Advanced Math Functions

In addition to the math functions discussed in Part Two, PractiCalc II also has 12 other math functions whose uses are more specialized, but nonetheless of equal importance.

The following section will briefly explain each math function and how to use it within a formula. We will not attempt to set forth definitions of the mathematical functions, assuming that if you intend to use them, you understand their meaning.

IF

More commonly known as the “If . . . then” function, IF acts as a selection statement. The statement says, in effect, IF X IS TRUE, THEN DO Y. IF NOT TRUE, DO Z. The IF function is used in formulas and, therefore, must be designated as such by pressing control F.

Think of the IF statement as having three parts: X, Y and Z. They are written in a formula in the following manner; IF(X,Y,Z). The parts are always surrounded by parentheses and separated by commas.

The condition, **X**, may be a cell reference or a formula using any of PractiCalc II's math functions or the equal to sign (=).

If the condition X is true, then Y will be executed. Y can be a value (a numeral or cell reference). The value of Y is then placed in the cell where the formula containing the IF function is located.

If the condition X is false, then Z will be executed. Z is also a value (a numeral or cell reference) and will appear in the cell where the formula containing the IF function is located. It is not necessary to have part Z; if the statement is false, nothing will occur.

IMPORTANT: THE RESULT OF THE IF FUNCTION WILL ALWAYS APPEAR IN THE CELL WHICH CONTAINS THE IF FUNCTION IN ITS FORMULA. THE RESULT CANNOT BE DIVERTED ELSEWHERE.

The following examples will illustrate the use of the IF function.

Example 3-J:

IF(A5*8=248,1,0) says that if A5 multiplied by 8 equals 248, then enter 1 in the formula'd cell. If it does not equal 248, then enter 0.

IF(D1<9,5,100) says that if D1 is less than 9, enter 5 in the formula'd cell. Otherwise, enter 100.

COU

Another one of PractiCalc II's range functions, **COU** represents the **count** function. This function will count the number of numeric entries in a given range.

Example 9-K:

To find the total number of numeric entries in column 7 between rows D and V, use the formula COU(D7.V7)

SQR

SQR stands for the square root function which will find the square root of any given value. The value may be a numeral or a cell reference and must be isolated in parentheses.

Example 3-L:

To find the square root of:

cell B7
123
(B7 – 123)*10

use the formula:

SQR(B7)
SQR(123).
SQR((B7 – 123)*10)

INT

The integer function (**INT**) finds the integer or whole number value of a numeric quantity. It does *not* round the value to the nearest whole number, but eliminates the places to the right of the decimal point.

Example 3-M:

To find the integer value of:

cell Z99
1.28
(19*2.3)/C2

use the formula:

INT(Z99)
INT(1.28)
INT((19*2.3)/C2)

SGN

The sign function (**SGN**) finds the sign (positive, negative or zero) of a value and yields 1 if positive, 0 if equal to zero and – 1 if negative.

Example 3-N:

To find the sign of:

cell B4
(B5 – 45)

use the formula:

SGN(B4)
SGN((B5 – 45))

ABS

ABS represents the absolute value function which finds the numerical value of a number regardless of its sign.

Example 3-O:

To find the absolute value of :

F7
(G6/7) – 78

use the formula:

ABS(F7)
ABS((G6/7) – 78)

LOG

Logarithms (base e) of values are found by using the function **LOG**.

Example 3-P:

To find the logarithm of:	use the formula:
J3	LOG(J3)
452	LOG(452)
(AC6/5)	LOG((AC6/5))

EXP

To find the expression which results when base e is raised to a certain power, use the math function **EXP**.

Example 3-Q :

To find the exponent of:	use the formula:
L9	EXP(L9)
3	EXP(3)
(S3/9)	EXP((S3/9))

To raise a number to a specific power, use ****** as the mathematical operator. For example the formula **3**2** means three squared (to the second power) which equals nine.

RND

RND is the random number generator function. The function always generates a number between 0 and 1 which can be multiplied by a factor for larger random numbers. A number in parentheses must always follow RND. Any number can be used; the result will always be between 0 and 1.

Example 3-R:

To generate a random number between 0 and 1, use the formula **RND(0)**. To generate a random number between 1 and 10, use the formula **(RND(0))*10**.

The Trigonometric Functions

PractiCalc II is also equipped with four trig functions: sine (**SIN**), cosine (**COS**), tangent (**TAN**) and arc tangent (**ATN**). These functions must be followed by a numeral, cell reference or formula in parentheses.

Example 3-S:

To find:	use the formula:
sine of D5	SIN(D5)
tangent of 56	TAN(56)
cosine of H9 – 4.2	COS((H9 – 4.2))
arc tangent of 1.9	ATN(1.9)

The Direction Feature

Control F, used to designate an entry as a formula, may also be used to create spreadsheets which can be designed by one person, then used by another without the need for accompanying instructions. Known as the **direction feature**, this application of control F enables you to use another's PractiCalc II spreadsheets without explanation or the need to write duplicate spreadsheets.

Take, for example, a spreadsheet which is used each month to compute sales performance of a small corporation. The only new values entered each month are the individual sales figures of each salesperson. These figures are then the basis for all other calculations. A single spreadsheet, with the necessary formulas, could be written to provide the format for each month's worksheet.

With the direction function, the initial 'author' of the spreadsheet could enter a series of **prompts** in the appropriate cells. The prompts would be, for example, ?SALES SMITH, ?SALES DONNE, ?SALES LEE, etc. The spreadsheet could then be shared with someone who would not need to know where to enter the data. The second (or third or fourth) user need only type ! to calculate. The first prompt would appear on the data line. When a value was entered, the next prompt would appear. When all necessary values were entered, the spreadsheet would be calculated according to the formulas entered by the initial user.

IMPORTANT: BECAUSE THE QUESTION MARKS (?) USED IN THE DIRECTION FUNCTION HALT THE CALCULATION PROCESS, THEY SHOULD ONLY BE ENTERED JUST BEFORE THE SPREADSHEET IS GIVEN TO ANOTHER USER.

To flag a location where another person should enter a piece of information into a spreadsheet which you've created,

- Move the cursor to the cell where the varying data is to appear.
- Type ^F.
- Type ? and a **label** which will adequately instruct the second user.
- Press **RETURN**.

Continue with this process to each cell which requires a prompt for a second user.

When the spreadsheet is given to a second user, all he need do is press !. This will initiate the calculation process. When the process reaches a formula which starts with a question mark, it will halt and display the prompt for that cell on the formula line. This will instruct the user to enter the figure requested. He then presses **RETURN** and the next prompt will appear on the formula line. When the last prompt has been answered with an entry, the entire spreadsheet will be calculated, resulting in the current answers.

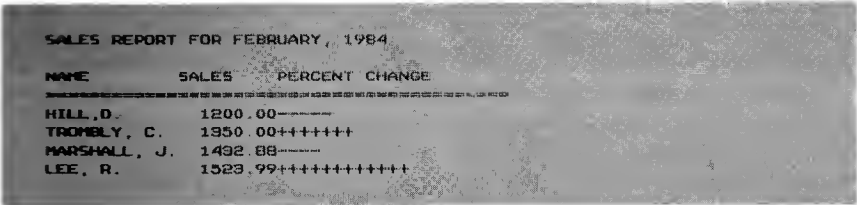
To erase the question-marked prompts from a spreadsheet file, move the cursor to a cell which contains a prompt. Type ^F and press **RETURN**. This negates the question-marked formula. Follow this procedure for each cell in which a prompt is located.

There is also an erase feature described under Partial Spreadsheets later in this section which can be used to remove the question-mark prompts without disturbing the data in a spreadsheet.

Graphing With PractiCalc II

With PractiCalc II and the Apple II, values can also be represented as horizontal bar graphs. The bar graphs or **histograms**, are drawn by a series of plus signs (+) for positive values while a line of minus signs (-) are used to represent negative values. One character, either + or -, equals one unit of a value.

Illustration 3-D:



NAME	SALES	PERCENT CHANGE
HILL, D.	1200.00	
TROMBLY, C.	1350.00	++++++
MARSHALL, J.	1432.88	
LEE, R.	1523.99	++++++

To convert a number to graphics,

- Move the cursor to the cell which is to be graphically represented.
- Type **/J**.

If a graphic representation of the number can fit in the cell, it will be represented as a bar graph of plus or minus signs. If not, an error message will appear. If the number cannot be graphed in the column as is, you can reduce the number by a known factor (e.g. divide by 10) or widen the column with the **/T** option.

To convert an entire column of numbers to the graphic format:

- Convert the first cell of the range according to the steps outlined above.
- Then type **/R**. The data line will read: REP FROM R/C
- Press **RETURN**. The data line will read: REP TO \$#R/C
- Type **\$** and the **row letter(s) and/or column coordinates** that mark the end of the range which is to appear in the graphic format.

The graphic format of the first cell will be replicated throughout the range.

The graphing function of PractiCalc II is limited, in part, by the graphic capability of the Apple II. The feature, however, is useful for quick visual comparison and can provide supplementary information for reports.

Consolidation of Spreadsheets

If you use PractiCalc II regularly as a tool to track information, you will perhaps have several spreadsheets containing separate but similar information. You might have a spreadsheet for each of the fiscal quarters, for each month or for each salesperson. The occasion may arise when it would be helpful to combine all salespeople's figures or all four quarters and use the resulting totals for analysis.

The process of laying one spreadsheet atop another to total their information is called **consolidation**. When several consecutive spreadsheets are loaded *without* clearing the screen between load processes, PractiCalc II totals all values which appear in each cell in each spreadsheet. Let's say you were consolidating four quarters' figures and in each quarter's spreadsheet, cell F8 carried the total spent on taxes. If all four spreadsheets were consolidated, cell F8 would, after the consolidation, hold the total spent on taxes for the year.

In order to consolidate files, the PractiCalc II spreadsheet must be in the *manual* mode of calculation. (For more information on the mode of calculation, refer to Part Four, The Options Menu.) The only other item to remember is that the last sheet loaded takes priority; its values are **added** to any values already in common cells, but its formulas and labels **replace** and become the formulas and labels of the consolidated version *until another sheet is loaded*.

To consolidate several files,

- Clear the screen by typing **/C** and then **Y**.
- Be sure that PractiCalc II is operating in the manual mode of calculation. (Refer to Part Four.)
- Load the first spreadsheet by typing **/L** and **the file name**.
- Press **RETURN**. The file will be loaded.
- Load the second spreadsheet by typing **/L** and **the file name**. Press **RETURN**.

Continue the process until all spreadsheets have been loaded. The labels and formulas of the last sheet loaded will replace all other labels and formulas. The spreadsheets will be automatically added as they are loaded to those already in the Apple.

In Illustration 3-E, the first three screens show the first three quarters of the year. Screen (iv) shows the first (i) and second (ii) quarters when consolidated. Screen (v) displays the results of loading (iii) onto (iv) without clearing the screen.

Illustration 3-E:

A 1ST QTR SALES	
B SMITH	5
C JONES	6
D WESTON	4
0	1

(i)

A 2ND QTR SALES	
B SMITH	8
C JONES	7
D WESTON	2
0	1

(ii)

A 3RD QTR SALES	
B SMITH	5
C JONES	4
D COURT	6
0	1

(iii)

A 2ND QTR SALES	
B SMITH	8
C JONES	16
D WESTON	6
0	1

(iv)

A 3RD QTR SALES	
B SMITH	20
C JONES	24
D COURT	12
0	1

(v)

Partial Spreadsheets

PractiCalc II is equipped with features which make it possible to save and load partial spreadsheets. This option is especially useful when a new spreadsheet requires a portion of another file as its starting point. Accounting ledgers, check-books and any worksheet which keeps track of something over a period of time, often need to carry forward information from one spreadsheet file into the next.

You can use the partial saving and loading of PractiCalc II to 'cut and paste' together spreadsheets. This allows you to create new spreadsheets with pieces of several other files.

Note 3-E: PractiCalc II's ability to calculate manually or automatically is discussed in Part Four. The option of manual or automatic calculation is saved with the files. Remember, for future reference, that any spreadsheets which will later be involved in partial loading or saving should first be saved in the manual mode.

Partial spreadsheets are loaded and saved much the same way as full spreadsheets except the portion to be loaded or saved is specified with the file name. Loading partial spreadsheets is much like consolidating in the sense that the formulas of the last sheet loaded take precedence over any cells in where there is an overlap.

Much of the data which will be loaded and saved in partial spreadsheets will be formulas and values. If a partial spreadsheet with formulas is loaded and calculated, the results could prove disastrous for the new spreadsheet which you were assembling, since the formulas have not been rewritten to reflect the new values. For this reason, it is best to erase values and formulas if not needed in partial spreadsheets and only work in the manual calculating mode when using partial spreadsheets.

Unnecessary values and formulas can be erased when most convenient for you; just remember to eliminate them before calculating. Otherwise, you'll reference incorrect values in formulas, or have your values mistakenly changed by inappropriate formulas.

PractiCalc II's replicate command includes a feature which selectively erases instead of copies. This particular feature was added specifically for use with loading and saving of partial spreadsheets. You can use the erase feature to retain values in cells and erase formulas, or to retain formulas and erase values. Be sure that you don't erase your only copy of the formulas or values if you need them for future use.

To erase formulas from cells, but retain the resulting values,

- Place your cursor over a cell which contains a value, but **no** formula.
- Type **/R**. The screen will read: REP FROM R/C
- Press **RETURN**, since the cursor is on the cell from which you are replicating. The data line will read: REP TO \$#R/C
- The pound sign (**#**) represents the ability to erase a value or formula and retain **only what** is in the source cell. Type **#** and the starting and ending coordinates (separated by a comma) of the range in which the formulas are to be erased. Press **RETURN**.
- Move the cursor to check and see that the formulas have been erased and the values retained.

To erase values from cells, but retain the formulas,

- Place the cursor over a cell which contains a formula, but **no** displayed resulting value.
- Type **/R**. The data line will read: REP FROM R/C.
- Press **RETURN**. The data line will read: REP TO \$#R/C
- Type **#** and the starting and ending coordinates, separated by a comma, of the range in which the values are to be erased and the formulas kept.
- Press **RETURN**. The formulas will remain intact, while the resultant values will disappear.

The most important rule to remember about erasing values and formulas with the replicate command is that the cursor must be placed over a cell which contains *only* what you want retained (formula or value) after the erasing procedure.

The erasing procedure is also very useful for removing the question-marked prompts used with the direction feature since the prompts, if you remember, are entered as formulas.

Saving Partial Spreadsheets

To save an entire spreadsheet, for example, you type **/S** and the name of the file. The spreadsheet which is on the screen (and in the memory of the Apple) at that time would be saved in its entirety under the name **SAMPLE**.

To save only columns 12 and 13 from rows A to Z of the spreadsheet on the screen, you would type **/S**, then **SAMPLE,A12,Z13** and press **RETURN**. The two columns of the spreadsheet, from rows A to Z, would be saved under the name **SAMPLE**.

When saving entire or partial spreadsheets, remember that a file name can represent only **one** file. Thus, if you save all the information on the screen under the name **SAMPLE**, and then save only two columns of the same sheet under the name **SAMPLE**, you will be told that the file exists and asked if you want to write over it. In saving spreadsheets, one name can only represent one sheet, regardless of whether it is two columns by two rows or 30 columns by 50 rows.

To save a portion of the spreadsheet currently displayed on the screen,

- Make certain there is an initialized data disk in the drive.
- Type **/S**, the file name, and the starting and ending coordinates, separated by a comma, of the rectangular area you wish to save. For example, **TEST,A0,B5 JANUARY,T15,X16**
- Press **RETURN** and the designated portion of the file will be saved.

Loading Partial Spreadsheets

Once a spreadsheet is named and saved to a data disk, pieces of that spreadsheet may be loaded back into the Apple as many times as necessary. Be careful not to write over an entire spreadsheet by loading and then saving a portion of it with the same name.

To load an entire spreadsheet, you would type **/L** and the name of the spreadsheet.

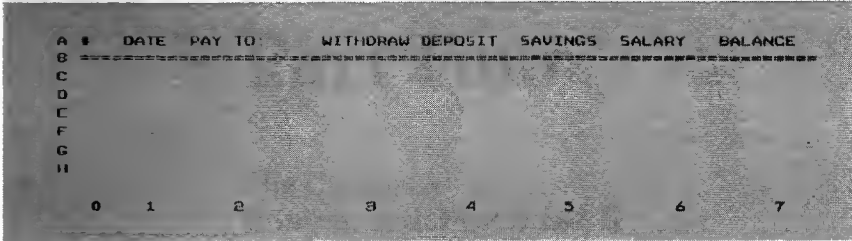
To load a portion of a spreadsheet,

- Insert the data disk which contains the file in the drive.
- Type **/L**. Then type the **file name** followed by the two coordinates, separated by a comma, of the area to be loaded. Press **RETURN**.

That portion of the spreadsheet will appear on the screen.

Exercise 17:

To prepare the checkbook spreadsheet for *your* entries, place the cursor in cell C0. Type /R, press RETURN, type #H6 and press RETURN. Then place your cursor in cell I7, press ^F, type A0 and press RETURN. This creates a formula without a number which you can use as a source to leave the formulas of the balance column intact. Then press /R, press RETURN, and type #C. All formulas and titles within the spreadsheet will be kept, leaving you with a template into which you can enter your actual checkbook entries. Save the file for future use. The spreadsheet will look as follows:



The image shows a spreadsheet template with the following structure:

A	B	C	D	E	F	G	H	I
	DATE	PAY TO:	WITHDRAW	DEPOSIT	SAVINGS	SALARY	BALANCE	
B								
C								
D								
E								
F								
G								
H								
	0	1	2	3	4	5	6	7

Error Messages

Error messages will occasionally appear in the cells of the PractiCalc II spreadsheet during calculation. They are usually caused by one of the following common mistakes:

1. Division by zero
2. Trying to take the square root of a negative number
3. Syntax errors (where the components of a formula are incorrect)
4. Reference to a non-existent cell (Example: Calculation of the formula $A1 = IZ100$ will produce an error message since IZ100 is beyond the limits of the spreadsheet.)
5. Attempt to graphically represent a number in a column of insufficient width

Part Four

The Options Menu

Printing with PractiCalc II

Quick Reference Guide to PractiCalc II

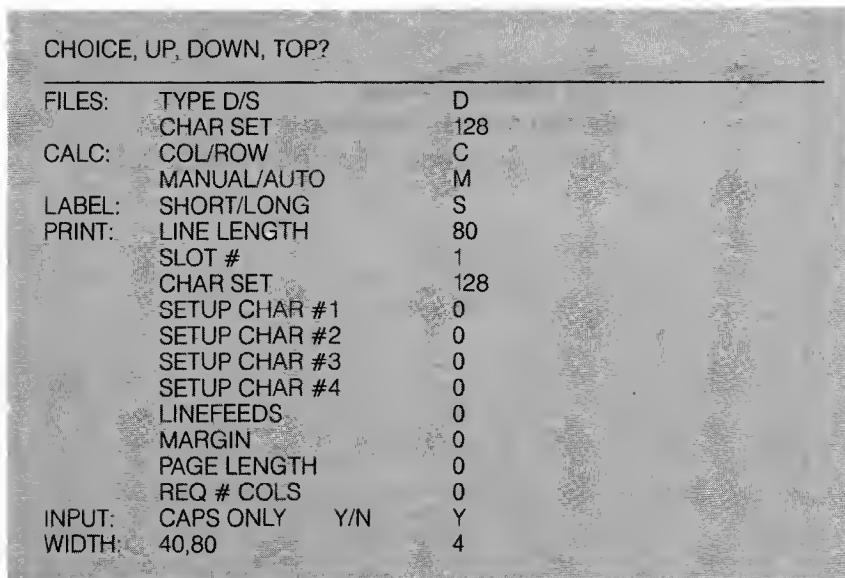
The Options Menu

Besides the command menu which was introduced in Part Two, PractiCalc II has an options menu which is used to set values that are rarely changed within the program. Once set, the majority of these values remain so until you choose to change them.

Unlike the command menu, the options menu requires the entire screen for display. However, entering the menu will not disturb the data you are currently working on in the spreadsheet.

The menu is accessed by typing / for the command menu and then **O** for Options. All listings in the options menu may be changed as many times as necessary. To see the menu, type /**O**. The following display will appear.

Illustration 4-A.



CHOICE, UP, DOWN, TOP?		
FILES:	TYPE D/S	D
	CHAR SET	128
CALC:	COL/ROW	C
	MANUAL/AUTO	M
LABEL:	SHORT/LONG	S
PRINT:	LINE LENGTH	80
	SLOT #	1
	CHAR SET	128
	SETUP CHAR #1	0
	SETUP CHAR #2	0
	SETUP CHAR #3	0
	SETUP CHAR #4	0
	LINEFEEDS	0
	MARGIN	0
	PAGE LENGTH	0
	REQ # COLS	0
INPUT:	CAPS ONLY	Y/N
WIDTH:	40,80	4

When the menu appears on the screen, there is a shaded cursor over the first option. To move the cursor down the screen, press **^Z**. To move the cursor up the screen to select an option, press **^Q**. To exit the menu and return to the spreadsheet, type **^T** (top).

The options appear above as they are set when the program is first loaded. Most of the options, if changed, are retained with any spreadsheets which saved once the options have been changed. The only two which are not saved are the file storage type (D/S) and the screen display width (40/80). These can easily be set again as explained below.

The following pages will explain each option and how you can use them to further enhance the PractiCalc II program.

Files:

Type D/S

There are two methods of storing the data of your spreadsheet. The usual method of storage, symbolized by the letter **D**, allocates storage space for each cell of the spreadsheet which contains data as well as all blank cells between the filled cells.

PractiCalc II offers an alternate method of storage. If you know that the information on a single spreadsheet will be spread out among the 250 rows and 100 columns, with some data around A0 and other around IU99, for instance, then selecting the **S**-type of storage will maximize the memory of your spreadsheet. **S**-type storage allocates storage space only for the cells which contain data; thus, large blank areas of space between data do not use valuable memory space.

This option is fixed at D-type storage when the program is loaded. To change to S-type storage,

- Type **/O**. The cursor will be on the first listing.
- Type **S** (or **D**).
- Press **RETURN**.

Use S-type storage only when you know that your information will be scattered over the spreadsheet since D-type storage is the faster of the two methods.

Char(acter) Set

This entry in the options menu refers to the ASCII character set used for storage of data. The true ASCII character set starts at a value of 0. The ASCII character set commonly used by Apple for storage starts at 128.

The PractiCalc II program, when purchased, is set with a storage character set starting at a value of 128. Should you need to change that,

- Type **/O**.
- Press **^Z** to move the cursor down to the second listing.
- Type **0** and press **RETURN**.

Calc(ulation):

Col/Row

The method by which PractiCalc II calculates was explained earlier in Part Two as being column by column, from top to bottom, left to right. This order is designated **C** (column) in the menu. The order, however, in which the program calculates can be changed to row by row, left to right, top to bottom. To do so,

- Type **/O**. Move the cursor to the **CALC** option.
- Type **R** (or **C**).
- Press **RETURN**.

Occasionally, when PractiCalc II is calculating in the manual mode, a correct answer to a formula on the left side of the spreadsheet may not appear until **!** has been pressed twice. This will happen if the formula on the left side of the sheet is dependent on a formula on the right side of the sheet for one of its values. The left formula cannot receive the calculated value of the right formula in only one calculation because the calculation process will have already passed the left formula. No provisions are made to return with the computed value of the formula from the right to update the formula on the left.

Depending upon the arrangement of formulas, the row method of calculation can sometimes eliminate the need for pressing **!** twice when calculating in the manual mode. However, row calculation is noticeably slower than column calculation.

Manual/Auto

The manual mode of calculation, which is in effect when PractiCalc II is initially purchased, requires you to type **!** to arrive at the solutions to the formulas contained in the spreadsheet. The alternate mode of calculation is **automatic** where all formulas are calculated the moment they are entered.

To switch to the automatic mode,

- Type **/O**. Move the cursor of the menu over the **MANUAL/AUTO** choice.
- Type **A** (or **M** to return to manual mode).
- Press **RETURN**.

The automatic mode provides up-to-date information as you enter data into the spreadsheet. The manual mode is often preferred because it allows you to choose when to calculate the spreadsheet. The manual and automatic modes both work successfully with row or column calculation.

Label:

Short/Long

One of PractiCalc II's unusual features is its ability to expand the contents of a cell through the adjacent cells.

When the program is loaded, the short label feature (**S**) is in effect. Thus, when a 15-character label is entered in a 9-character column, only the first 9 characters are displayed in the cell. To see the full entry, you must move the cursor to the cell and press **#**.

With the long label (**L**) format, a label can be entered in one cell and will 'overflow' into the cells to the right (if they are empty) until the entire label has been displayed. Long labels may be up to 88 characters long and are extremely useful when titling reports or using PractiCalc II as a mini-word processor to write notes to accompany spreadsheets. Just remember: A long label 'belongs' to the cell in which it was initially entered. Each part is not entered in a separate cell; rather, the entire label is entered in the first cell and merely displayed 'through' the adjacent cells to the right. If the first cell of an expanded label disappears from the screen, the entire label will disappear as well.

If the cells to the right of a cell which contains a long label have data in them, only the first cell of the label will be displayed. When the adjacent cells are blanked, the label will 'pop up' and be displayed.

To change the label format,

- Type **/O** and move the cursor to the fifth listing.
- Type **L** or **S**.
- Press **RETURN**.

Print:

The next eleven listings in the options menu control the print feature of PractiCalc II and make it possible for the program to print to a variety of hardware combinations.

However, to print the spreadsheets written with PractiCalc II, you will need a compatible printer, a compatible printer interface card and the appropriate cable.

The nine options listed below essentially provide the means to configure the program to most printer setups. Many common printers and interface cards require no setup values at all.

Because of the limitless combinations of interface cards and printers which are currently being used with Apple computers, it is virtually impossible for CSA to provide you with setup values for each make of interface and printer. Should you require the use of the setup characters (as listed in the options menu), you **must** refer to the owner's manuals which accompanied your interface and printer for the necessary ASCII values. CSA makes no guarantee that the program will print with every combination that exists today. However, every effort has been made to make the PractiCalc II program as adaptable as possible.

Line Length

The line length refers to the character width of your printer. Common widths are 40, 80 and 132 characters. PractiCalc II is set to 80 characters when initially purchased. To set PractiCalc II to a different printer width,

- Type **/O** and move the cursor to the Line Length listing.
- Type the necessary number and press **RETURN**.

Slot

Your printer is connected to your Apple II through an interface card which is inserted in one of the slots inside the Apple. Each slot is numbered. Most printer interfaces use slot #1 in the Apple computers; thus, the slot number has been set at one. To change the slot number,

- Press **/O** to reach the options menu and move to the seventh listing.
- Type the correct slot number and press **RETURN**.

Char(acter) Set

The same two character sets used in storage of information are also used in reference to printing. Most Apple hardware setups recognize the ASCII character set which starts at 128. Thus, the printing character set is 128 when the program is purchased. If you need to change the character set starting value to 0,

- Press **/O** and move the cursor to the second character set entry.
- Type **0** and press **RETURN**.

Setup Char(acters) #1-4

PractiCalc II provides the input format for four setup characters. The setup characters are ASCII values which are recognized by the interface and printer. The values send a message to the printer to alter the printing in some way. ASCII characters are sent to signal condensed printing, bold printing, etc. Refer to your printer and interface manuals for information on which ASCII values can be used and what effect they have on printing.

If you do not need to send any setup characters to the printer, leave each characters set with a value of zero as they are when the program is purchased.

To change any of the setup characters,

- Type **/O** and move the cursor to the setup character line.
- Type the correct ASCII value and press **RETURN**.

Linefeeds

This feature allows you to set the number of linefeeds to be executed after each carriage return. This spacing is often adjusted when printing labels or other information in a special format. To enter the number of linefeeds,

- Type **/O** and move the cursor to the linefeed option.
- Type the required number and press **RETURN**.

A line feed of zero will provide a single carriage return between each line of type and single spacing.

Margin

If you do not want the printer to start printing at the left edge of the paper and would prefer not to move the paper within the printer, the margin listing allows you to select the column where printing is to start. To choose the left margin,

- Press **/O** and move the cursor to the margin option.
- Type the number of spaces the left margin is to be indented.
- Press **RETURN**.

A margin of zero does not cause the print head to indent at all, but to start printing at the left-most position. Depending upon your printer, the starting position of the printer can also be varied by actually moving the paper left or right along the carriage.

Page Length

Many spreadsheets are longer than a single page. Thus, a page break would be helpful so that printing does not continue over the perforated edge onto the next sheet of the paper.

A page length value of zero implies continuous printing without page breaks. A typical sheet of 8-1/2 x 11-inch paper is 66 lines long. To set the page length,

- Press **/O** and move the cursor to the page length option.
- Type the correct number of lines per page and press **RETURN**.

If you do set a page length, the printing routine will stop at the end of each page. You must use the print command again to start the printing.

Req(quired) # of Columns

PractiCalc II, because of the sorting command and the long label format, can easily be used as a data-base program to generate mailing labels. To ensure that information to be printed does not exceed the width of your mailing labels, set the required number of (character) columns equal to the width of the labels. To do so,

- Press **/O** and move the cursor to the correct listing.
- Type the required number of characters equal to the width of the labels or paper you will be printing on.
- Press **RETURN**.

Input:

Capitals Only

PractiCalc II, when loaded, accepts only upper case or capital letters. On the Apple IIe, PractiCalc II can be changed to accept and print upper and lower case letters. To change the program for upper and lower case letters,

- Press **/O** and move the cursor to the last listing.
- Type **Y** for all capitals, **N** for upper and lower case letters.
- Press **RETURN**.

Once the program is set to accept upper and lower case letters, however, all PractiCalc II commands must be given with capital letters. When deleting a column, for instance, the program will *not* recognize **/d**, only **/D**.

Width:

40,80

PractiCalc II can be used with Apple IIplus and IIe computers which contain an Apple 80-column card or a Videx 80-column card (firmware 2.4 or later). When originally purchased, PractiCalc II is set to display 40 columns. To change the display to make use of the 80-column card within your Apple,

- Type **/O** and move the cursor to the last listing in the menu.
- Type **8** to set to 80 columns, **4** to set to 40 columns.
- Press **RETURN**. The options menu should reflect the change in the number of columns displayed.

If you change from 80 columns down to 40 columns, it will be necessary to press **CONTROL** and **RESET** at the same time to deactivate the 80-column card and correctly display the data at 40 columns. When you return to the spreadsheet, your data will not have been disturbed.

Most features of the menu, once set, will be retained by the program until changed. Certain features will slow down the display and/or calculation speed of the program slightly; the 'quickest' combination is the manual calculation mode, with short labels and a 40-column display. However, any loss of speed caused by using other options is barely perceptible. The options may be changed as many times as needed and are retained with the files which are written with the PractiCalc II program.

Printing With PractiCalc

Although printing spreadsheets with PractiCalc II is not difficult, an explanation of the procedure had to be postponed until the options menu was explained. In order to successfully print spreadsheets with PractiCalc II, it is essential that you have read the previous section on the options menu.

Many printers and their compatible interfaces will work with the PractiCalc II program just as it comes from the package. Therefore, we suggest you try to print a spreadsheet without entering setup characters and other specifications. The only values you might have to change at first would be the slot number of the printer interface card (originally set at 1) and the line length, if your printer is less than 80 characters wide. Once those values are correctly set, you can attempt to print a spreadsheet.

PractiCalc II prints in rectangular areas, marked in the upper left by the cursor and in the lower right by cell coordinates which you supply. To print a spreadsheet,

- Have the spreadsheet to be printed displayed on the screen.
- Place the cursor in the upper-left corner of the area to be printed (often cell A0).
- Type **/P** and the data line will read: PRINT TO RC
- Type **the coordinates** of the lower-right cell of the rectangular area to be printed. The lower right corner does not have to be displayed on the screen if the spreadsheet to be printed is large.
- Press **RETURN**.

If the program does not print to suit your needs, enter the options menu (**/O**) and enter the correct values for the printer specifications. The number of entries you will need to make in the options menu is based on how many printing features you are attempting to evoke. Refer to your printer and interface card manuals for recognized values.

The time you may spend arriving at the correct input values is well worth the effort. Once the correct values are written into the options menu, they are saved with the files which are written at that time. Each time you create a file, you will have to enter the options menu and enter the needed characters. However, once entered, they become an integral part of that file and will not need to be reset, although they can always be changed.

Once you have configured the program to match your hardware, you should be aware that PractiCalc II's printing is based on a combination of two basic ideas:

1. PractiCalc II prints exactly what is displayed on the screen (if it is included in the rectangular area to be printed).
2. PractiCalc II prints from the cursor position to the lower right corner coordinates which you supply in the print command even if the lower right coordinates are not displayed.

What the printing rules imply is that you can take titled columns or rows and print them with rows or columns which are not adjacent. For instance, you could have columns 0 and 1 displayed on the screen as fixed titles next to columns 19, 20 and 21. When you attempt to print, place the cursor in A0 (which you can reach by using control T). When the print command reads PRINT TO RC, type the coordinates of the cell which marks the lower right corner of the area to be printed *even if it's off the screen*; for example, Z22. The program will print rows A-Z of columns 0, 1, 19, 20, 21 and 22. The printing routine is a versatile combination of what's actually on the screen and what's between the cursor and the given coordinates.

If you realize that you do not have your printer connected to the Apple or turned on, and have already started the print routine, the program will stop with the words PRINT TO RC on the data line. Press **CONTROL** and **RESET** at the same time. The data line will clear, but your spreadsheet will remain intact. CONTROL/RESET will stop the execution of many of PractiCalc II's functions; however, use these keys with caution. If you use them to interrupt a function of PractiCalc II which was *moving* data, the spreadsheet may clear.

Note 4-A: It is strongly recommended that you *always save a spreadsheet before printing*. If the program should 'hang' due to incorrect setup values, you would then have a saved version of your file and would not lose valuable data.

Quick Reference Guide to PractiCalc II

The Quick Reference Guide has been designed for *all* users of the PractiCalc II program. For advanced users who were familiar enough with spreadsheets to jump into the midst of the manual, this guide will provide the essentials of PractiCalc II: the basic facts that enable you to use the program without reading the manual. And for those who read the entire manual, the guide will provide short descriptions of PractiCalc II's features as a handy 'refresher' course.

Loading PractiCalc II: Insert the program disk into an Apple IIplus or Apple IIe (minimum 48K required). Turn on the computer; PractiCalc II will be automatically loaded.

Moving The Cursor: The cursor is moved by the following keys:

control Q moves the cursor up the screen

control Z moves the cursor down the screen

right arrow key moves the cursor left to right

left arrow key moves the cursor right to left

ESC The escape key in the upper left corner will remove you from any of PractiCalc II's commands, and erase any characters which have been typed, but not entered in a cell.

> The > brings a prompt of RC> to the top of screen. Enter a row, column or cell, press **RETURN** and the cursor will move to the specified location.

! Type ! (SHIFT and the numeral 1) to calculate the spreadsheet.

The # key (SHIFT and the numeral 3) displays the actual contents of a cell which cannot be completely displayed within its given column width. Place the cursor over the cell to be read; type # and the contents will appear on the data line.

Control Keys: The control key, on the left side of the keyboard, is represented in the manual by ^. The following keys, when typed with the CONTROL key depressed, activate these features:

^D Deletes last character typed (also active in edit mode)

^E Changes into the edit mode

^F Designates an entry as a formula

^I Inserts character space when in edit mode

^L Designates an entry as a label

^Q Moves the cursor up the screen

^T Moves cursor to top of screen (cell A0)

^Z Moves cursor down the screen

The Command Menu: All commands within the menu are accessed by typing / and the appropriate letter. If the command refers to a particular row, column or cell which you do not specify in the command, the cursor is assumed to mark that row, column or cell. Characters to be typed for each command are shown in boldface type below. RETURN's are not noted; use where necessary.

- /B** Blanks the cell beneath the cursor.
- /C** **Y** to clear the spreadsheet;
N to return to the spreadsheet;
E to exit the program.
- /D** **R** to delete a row;
C to delete a column.
- /F** **I** to format a cell to integer;
\$ to format a cell to dollar;
F to format a cell to floating decimal;
G to format a cell to global.
- /G** **I** to set a global integer format;
\$ to set a global dollar format;
F to set a global floating decimal format;
3-38 to set the global column width.
- /H** **C** to start viewing the catalog of a disk; **RETURN** to see each listing.
I to initialize a disk;
D and a **file name** to delete a file.
- /I** **R** to insert a row;
C to insert a column.
- /J** Changes the justification of a label;
Changes a value to a bar graph.
- /L** A **file name** to load a specific file;
A **file name and a range** to load a partial file;
RETURN to *start* the viewing of the catalogue and **^Q** or **^Z** to see the next entry in the catalogue; **RETURN** again once the title of the file to be loaded appears.
- /M** **Row number** if a row is to be moved;
Column number if a column is to be moved;
Cell coordinates if a cell is to be moved.
- /O** Provides access to options menu. See Part Four for complete descriptions of each option.
- /P** Printer should be turned on. Any required set up values should be recorded in the options menu. Cursor should be in upper left corner of area to be printed. Enter **cell coordinates of lower right corner** and press **RETURN**.
- /R** Enter **source coordinates** if necessary. Press **RETURN**. Enter **\$** if duplicating format only. Enter **#** if erasing values or formulas. Enter **target coordinates** if necessary. Press **RETURN**. Answer **F** or **R** as many times as is needed.

- /S** A **file name** when saving a file;
A **file name and a range** when saving a partial file;
If file exists, **Y** to replace with file on screen; **N** not to replace.
RETURN to start viewing of catalogue; **^Q** or **^Z** to see next entry.
- /T** **R** to fix row(s) as titles;
C to fix column(s) as titles;
B to fix row(s) and column(s) as titles;
N to 'undo' fixed titles;
G to return a column to global column width;
1-38 to set an individual column width.
- /X** Cursor is placed where largest entry should go; enter **row letter(s)** of other end of range.
- /@** Type the **entry you're searching for**; **@** equals a wild card when searching for labels; press **any cursor key**, **^T** or **RETURN** to start search in particular direction. Type any of those keys to continue search; **ESC** to exit search.
- /—** Type **character** to be used in lines or boxes; **range** to which character is to be drawn.

Additional Key Assignments for Apple IIe Versions

up arrow key: Acts the same as **^Q** to move cursor up the screen or through the catalogue.

down arrow key: Acts the same as **^Z** to move the cursor down the screen or through the catalogue.

DELETE Acts the same as **^D** both in and out of the edit mode.

TAB Acts the same as **^T** when not in edit mode.
Acts the same as **^I** when in edit mode.

All commands must be entered in the Apple IIe in CAPITAL LETTERS.

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Name _____

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Date purchased _____ Purchased from _____

Comments about program _____

Computer: Apple IIplus ___ Apple IIe ___ Date purchased _____

How much computer experience do you have? ___ Very little ___ Some ___ A great deal

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Listed above is your warranty number which will be on file at Computer Software Associates upon receipt of your Owner Warranty Card. Should you have any questions about your PractiCalc II program, please include your warranty number with all inquiries.

Technical Support

Questions regarding PractiCalc II are encouraged and welcome. For technical assistance, please call:

(617) 527-7510
9 a.m. – 5 p.m. (Eastern Time)

Back-Up Copies

To obtain a back-up copy of **PractiCalc II**, send your name, address and \$5.00 (check or money order) to:

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